THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. OCTOBER 24, 1895. CHICAGO, ILL. NUMBER 43.

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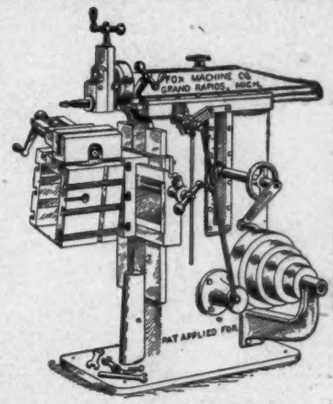

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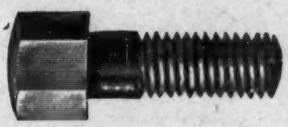

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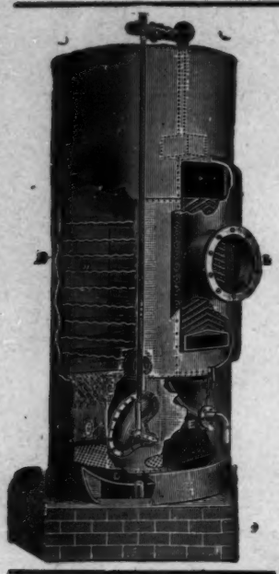

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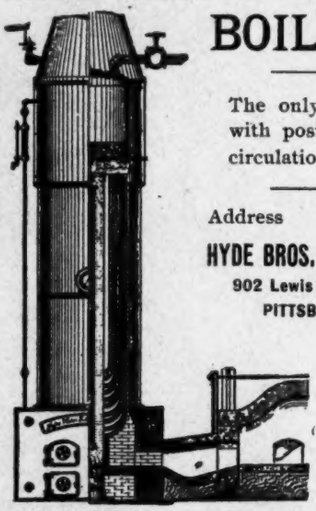

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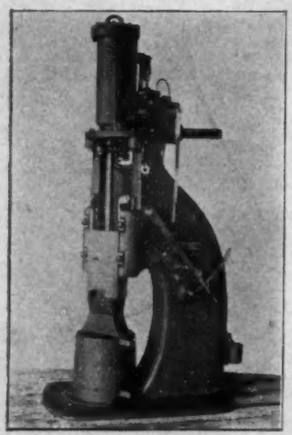

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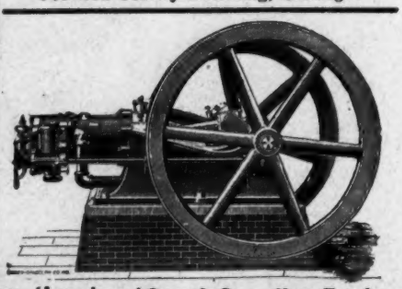

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THE IRON TRADE REVIEW

VOLUME XXVIII. CLEVELAND, O. OCTOBER 24, 1895. CHICAGO, ILL. NUMBER 43.

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The decline in Bessemer pig has been arrested and an advance of more than $1 a ton at Pittsburg has taken place within the week. Buying by two steel companies, though of only moderate proportions, has brought out the last of the speculative iron and made the furnacemen again a factor in the market. Sales at $15.25 in the valley are reported, equivalent to $16, Pittsburg, under the new 75-cent freight, and a few lots for delivery in the first quarter of 1896 have sold on a valley basis of $15.50. These transactions are significant as marking the restoration of a legitimate market and as enabling the trade to locate itself after several weeks of uncertainty. As the behavior of Bessemer has been the occasion of a general holding off there are predictions that with the situation now somewhat cleared up, there may come the buying in finished lines that has been much below the expected fall volume. The belief that the prices of steel products will be sustained for some time on a basis corresponding to the present price of Bessemer pig is supported by the latest developments in ore. High ocean freights are an effectual barrier to any early enlargement of imports from the Mediterranean. High freights on the lakes make it certain that expected shipments of Bessemer ores from Lake Superior will be deferred to next season. Much of the additional allotment of standard Bessemers, made to help out the Marquette shortage, will thus go over, the contracts having been written with a maximum freight clause. While the extent of the shortage is a matter of estimate, the fact is sufficient to account for the firm feeling on the part of producers of Bessemer pig. This is reinforced, moreover, by the strong position of the Bessemer ore companies relative to next year's contracts. The past week has shown a slightly better feeling in finished material. Buying on railroad account is reported from different points, chiefly for car shops. Several good orders for cars have been placed in the past 10 days. In the East a better tone has prevailed in manufactured iron and steel, with prices a shade firmer. Philadelphia reports a moderate business, with other orders likely to be given out by the end of the month, so that mills are inclined to take a stand at the reductions recently made. These have been most noticeable on plates, sales of tank steel being reported at 1.75c Philadelphia. There are evidences of cutting in the territory between Pittsburg and Chicago, and 1.65c Pittsburg has been shaded. Steel billets have had little sale in any market. Pittsburg sales have been made at $21.50, but demand is light and the market is less sensitive than that for Bessemer pig. Foundrymen generally are having a good run of work, but do not get prices for castings corresponding to the advance in pig iron and labor. They are buying little pig iron, but a renewal of demand for foundry irons is counted on for the near future.

THE CLEVELAND DISTRICT.

That there will be a shortage of Bessemer ores before the opening of navigation in 1896 is now generally accepted. While there has been more or less discussion of such a contingency from the time of the Marquette strike, the practical certainty of this outcome was not conceded until freight rates went out of ore shippers' reach and stayed at a prohibitive point long enough to make sure that a reaction was not to be expected. The additional apportionments of Gogebic and Vermilion ores to furnacemen short on their Marquette contracts were expected to assist materially toward providing a sufficient supply; but these sales were made with a contract clause carrying shipment over to next year in case freights went above $1.25 from the head of the lake. Notifications have been given that these ores will not be moved this year. Computations as to the amount of the shortage contain these elements: A consumption of Lake Superior Bessemer ores in the past three months at an annual rate of nearly 10,000,000 tons; shipments for the season of about 7,000,000 tons of ore that will enter into Bessemer mixtures. The amount of Bessemer ore on dock and in furnace yards last spring is an uncertain element, as is also the rate of Bessemer ore consumption in the six months that will elapse before 1896 ore can come down. Rail shipments of considerable amount will no doubt be made in the winter to the Chicago district, but this is out of the question, on present margins, for valley or Pittsburg furnaces. The prospects are that the conservative course of the ore companies' association the present season will be the pattern for its operations next year. An unsettled question is the attitude of the producers of Mesabi Bessemers, some of whom see that their interest will be conserved by co-operating with old-range companies. The question of a differential will probably be decided on the basis of two years of market experience and the consensus of furnacemen not interested in the new range, as to the relative values of Mesabi and other ores of Bessemer quality. In the past week the Escanaba rate on ore has vibrated between $1 and $1.10. Considerable Marquette tonnage has been taken in the past two days at $1.25. From the head of the lakes to South Chicago $1.50 has been done, but scarcely any business has been placed for Ohio ports, with wheat at 5c.

Pig Iron. Considerable Bessemer pig metal has been taken in purchases by Pittsburg steel makers the past week and the fact that valley furnacemen have been asked for prices by various buyers, both brokers and consumers, indicates that all the speculative iron is gone and that there is more buying to come. Sales are reported at $15.25 in the valley and $15.50 is quoted on transactions now pending, the latter being equivalent to $16.25, Pittsburg. There are furnaces still holding for $16 in the valley and altogether the situation has many elements of strength. Sellers of foundry iron look for a renewal of buying in that market in the next few weeks, attributing the condition of the past month to the halt called by the weakness in Bessemer. Foundry grades are for the most part held firmly at the prices heretofore quoted—$15 at valley furnace for No. 1 and $14@14.50 for No. 2. Southern No. 2 is very scarce and some producers have stopped selling. Gray forge is somewhat firmer, but buying is light. Valley producers have $12.50 as minimum and by some a higher price is asked. Lake

Continued on page 7.

THE CHICAGO OUTLOOK.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

The condition of the market is little changed from last week, buying being comparatively light in nearly every branch of the trade, and prices, as a rule, remaining firm. The railroads appear to be the most important buyers in the market at present, but even their business is largely in the future.

PIG IRON.—The total tonnage closed has been moderate both for Northern and Southern irons, but Northern furnaces report a rather better inquiry, and look for a larger business in the near future. Prices of all grades of iron are well maintained, and while there is talk among buyers of a possibly lower basis, sellers do not concede that iron will sell for anything less than present quotations in the closing months of the year. With the opening of the new year some of them look for a considerable advance. They base this view on the fact that the furnaceman's raw materials will be higher after navigation closes and that tendency among producers of pig metal will be to anticipate the higher basis of season contracts for ore and coke looked for with the opening of navigation next May. Freights from the Ohio River are expected to advance again 15 cents a ton about Nov. 1, making $4 a ton on Southern iron, and this last advance will be added to the Chicago prices. Quotations are now made as follows:

Lake Sup. Charcoal	$15 50@16 00	Southern No. 2 Soft	$ @13 85
Local Coke Fdy. No. 1	15 00@15 50	South'n Silveries No. 1	@15 35
Local Coke Fdy. No. 2	14 50@15 00	South'n Silveries No. 2	@14 85
Local Coke Fdy. No. 3	14 00@14 50	Jackson Co. Silveries	15 50@16 00
Local Scotch Fdy. No. 1	15 00@15 50	Ohio Silveries No. 1	15 00@15 50
Local Scotch Fdy. No. 2	14 50@15 00	Ohio Silveries No. 2	14 50@15 00
Local Scotch Fdy. No. 3	14 00@14 50	Ohio Strong Softeners	15 00@15 50
South'n Coke No. 2	@13 85	Alabama Car Wheel	17 00@17 50
South'n Coke No. 3	@13 60	Malleable Bessemer	
Southern No. 1 Soft	@14 10	Coke Bessemer	

BARS.—Car builders have again taken several lots of fair sizes and other contracts ranging from 500 tons down have been placed. Jobbers have been bidders on some large business, and in one or two instances have taken contracts away from the mills at less than association prices. The mills, however, appear to be very firm. Common iron is quoted at 1.50c to 1.60c; guaranteed, 1.60c to 1.65c. On soft steel bars there appears to have been some cutting, and quotations have been made at the price of iron, but most mills hold for 1.65c to 1.75c for strictly billet stock.

RAILS AND TRACK SUPPLIES.—Fair orders for rails have been received, and several consumers have asked for quotations for delivery the early part of '96, but no business of this character has yet been placed here. Quotations are unchanged: Rails, $29 and up; splice bars, 1.65c to 1.75c; track bolts, 2.25c to 2.45c; spikes, 1.95c to 2c.

BILLETS AND RODS.—The market has been quiet, and orders for only moderate quantities were placed, at $25 to $26 for billets and $34 to $35 for rods.

STRUCTURAL MATERIAL.—Business has been rather quiet in the past week, and no orders of any considerable size have been booked. Quotations are unchanged, except those on plates, which are lower. Beams and channels, 1.90c to 2c; angles, 1.85c to 1.90c; plates, 1.90c to 2c; tees, 2c to 2.10c. Small lots from stock are ¼ to ½c higher.

PLATES.—A fair business has been done, and the inquiry remains steady. Tank steel is off a little, and on this the market appears to be unsettled, owing to undue competition. Prices are now made, as follows: Tank steel, 1.90c to 2c; flange steel, 2.35c to 2.40c; firebox steel, 2.85c to 5c; boiler tubes, 60 to 65 per cent discount.

MERCHANT STEEL.—The market is still quiet, the only business of any importance going being a few contracts for mill shipment. Quotations are made: Open-hearth spring, tire and machinery steel, 2.20c to 2.25c; smooth finished machinery steel, 1.95c to 2c; smooth finished tire, 1.90c to 1.95c; tool steel, 5.50c to 7.50c; specials, 11c and upwards; Bessemer bars, 1.65c to 1.75c.

SHEETS.—Business in both black and galvanized sheets has been quiet, and orders have not been large. No. 27 common iron is quoted at 2.85c to 2.90c, and sheet steel at 2.90c to 3c, but sales have been made at lower figures. In our report last week an error was made in the quotation on galvanized, which should have been 70 and 5 per cent discount at which it is still selling.

OLD RAILS AND WHEELS.—Old iron rails are in light demand, and are held at $18.25 to $19, by dealers. Old steel rails are quiet at $13 to $15, according to length, etc. Old wheels are selling slowly at $13.25 to $13.75.

SCRAP.—The market is quiet, with only a small business being done in all except one or two grades. Prices are as follows: Railroad forge, $14.50; dealer's forge, $12 to $12.50; No. 1 mill, $9.50; heavy cast, $10 to $11; axles, $16.50; cast borings, $6; wrought turnings, $7.75; axle turnings, $8.25; mixed steel, $10.50 to $11; stove plates, $8.25; heavy melting steel, $11.25 to $12.25.

IN OTHER MARKETS.

[SPECIALLY REPORTED FOR THE IRON TRADE REVIEW.]

Pittsburg. Within the week the Bessemer pig market has turned again and is now $1 a ton higher than at the time of last report. One steel company whose furnace capacity has been considerably shortened, bought quite a block of metal and another has also been a buyer. It is thought practically all the spot iron has been taken off the market and the Bessemer pig engaged by brokers and other non-consumers for delivery in the last three months of the year has been transferred in the transactions of the past three months to various steel companies. Some sales are also reported for shipment in the first quarter of next year. A 10,000 ton transaction and one of 5,000 tons were made at $16 25, equal to $15.50 in the valley, the freight being 75 cents after Nov. 1. Some sales for delivery this year have been made at $15.25 in the valley, or $16 Pittsburg. The market for steel is unchanged, demand being light, but sellers expect higher prices, with the advance in Bessemer. We note a sale of 1,000 tons November and December, and a sale of 500 tons, same delivery, at $21.50 Pittsburg. Foundry and forge irons are dull, the former maintaining its footing on light sales at $15 for No. 1 and $14.25 for No. 2. Forge has sold at $13, but the feeling is now somewhat firmer. The talk of a shortage of Bessemer ores is more pronounced here in view of the carrying over of shipment of the late purchases of standard Bessemers, to next year. More inquiry is in the market on car account and several contracts have been given out by the railroads in the past ten days. All mills are still very busy, but the falling off in new orders for finished material is marked. Manufacturers look for a more active market now that Bessemer has turned for the better. They argue that the recovery noted in the past week is evidence of the stability of the improvement in iron, at least up to the point of $16 Bessemer, Pittsburg, and now that the proper level has been found again, they expect buyers of finished material to take hold again. There has been only moderate demand for bars, at 1.35c for steel and 1.40c for common iron, with the latter the more firmly maintained. Sheet mills are less pressed with work. Current sales are on a

basis of 2.65c and 2.70c for No. 27 common finished steel. Galvanized are 70 and 10 per cent. off. On plates, reports are current of considerable cutting in the East and in the farther West. All the desirable contracts recently taken have been at considerable concessions from quotations. The present range on tank steel is 1.70c and 1.75c, but in competitive districts these prices have been quoted, delivered though the freight was $2 a ton. Small lot orders keep up for building material. We quote 1 60c as minimum on beams and channels, and 1.50c on angles. The mills are doing little in old material at present, having their requirements covered on contracts in hand and looking for the market to ease while they wait. Old iron rails are quoted $18.50, and old steel rails $15. Connellsville coke production continues to break the record. Nearly 16,000 ovens out of 17,934 were in blast last week. In the week ending October 12, the estimated production was 172,225 tons, an increase of 6,025 tons over the heavy output of the preceding week.

Cincinnati. The most pronounced feature of the situation is the extreme difficulty of getting forward shipments of pig iron and coke, because of the great scarcity of cars. This is not confined to any section of the producing region, but is general. Connellsville coke makers are in some instances 30 days behind on their orders for foundry coke, and the Pocahontas ovens are unable to get anything like an adequate supply of empties to handle their product. In the South it is stated that the production of iron has been reduced because cars can not be secured to haul ores from mines to the furnaces. This being the case it is unnecessary to say that the transportation facilities are insufficient to handle their finished material, and the conditions are becoming aggravated rather than relieved. It is anticipated that when the Western crops begin to move, and cars are called for in that section more than at present, there will be experienced such trouble as has not been witnessed for a number of years. It is too late now for the railroads to get cars for this year's demands, even if their orders were given at once. It would seem that purchasers of pig iron are acting in concert with buyers of all classes of iron and steel products and have determined to purchase only for current wants. This has resulted in a return to the manner of buying that prevailed last year. Reports from most of the rolling mills and foundries show that they are well supplied with work for the present, but few of them have orders running more than 30 or 60 days ahead. It is believed that the restricted buying now noticed will make it necessary for those holding off to come into the market again within 30 days, and that there will be a healthy consumptive demand that will maintain prices at profitable figures. There is less talk of new furnaces starting in the South, and the only one now under consideration is at Clarksville, Tenn., which will probably be put into operation about Nov. 1. The scarcity of ore supply has caused a notable falling off in production in the South, and it is not possible to start enough furnaces there to push the output above that of several months past. Prices continue firm so far as the furnaces are concerned, and the concessions being offered are on the part of speculators who wish to unload their holdings at a profit.

Buffalo. Lake Superior charcoal iron has been quite and few sales reported. Coke iron made from Lake Superior ore has shown increased activity. The larger buyers are apparently more interested in watching the market than for some time past, and a few sales have been made running through several months at full prices. Furnaces in this district are more bothered to get iron forward than to sell their product. The scarcity of cars is being felt very keenly, and it begins to look as if the railroads must furnish new equipment soon. We here are not in a position to judge accurately what is going on in railroad circles, yet it appears that the railroads are in more of a buying mood than they have been. Taken altogether, the situation seems to grow stronger in this territory.

LAKE SUPERIOR IRON MINES.

The Franklin Iron Mining Co., of which Frank Rockefeller is president and Jas. Corrigan a director, has leased the Zenith mine at Ely from the fee owners, chief of whom are the Harvey Iron Co., of Ishpeming, Mich., and Robert Whitesides, of Duluth. The Zenith has an ore comparable to the Chandler. It has been wrought but one year, shipping 15,000 tons in 1892. An output of 100,000 tons is expected next year. The ore will be handled by M. A. Hanna & Co., Cleveland.

The Pence Ore Co. has been incorporated under the laws of Wisconsin and has secured from the Northern Chief Iron Co., a lease of the Pence mine at Hurley. The leading shareholder in the new company is C. Morris, of Cleveland, president of the Morris Coal Co. Other Cleveland men hold minor interests. The Pence ore is a desirable ore, some of the analyses showing 66 per cent of metallic iron and .017 in phosphores.

Ore shipments from Ashland last week were 39,642 tons; for the season, 2,206,952 tons.

Indications are that the season shipments from Escanaba will run in the neighborhood of 2,500,000 tons. Last year they were 1,644,770 tons; in 1893, 2,048,981 tons; in 1892, 4,010,085 tons; in 1891, 3,058,590 tons.

The report of C. M. Boss, inspector of mines of Gogebic county, Mich., shows 1,876,938 tons of ore mined in the Michigan portion of the Gogebic range in the year ending Sept. 1, 1895. The amount was distributed as follows: Anvil, 43,047; Ashland, 92,021; Aurora, 266,493; Brotherton, 9,760; Davis, 6,756; Eureka, 20,842; Newport, 149,257; Norrie and East Norrie, 696,440; Pabst, 203,907; Palms, 15,045; Sunday Lake, 3,800, Tilden, 369,570. The number of men employed Sept. 1, 1894, was 1,399; Sept. 1, 1895; 2,310—a gain of 911. Fatal accidents in the year, 11.

There is considerable shifting of mining forces. At Soudan, the Minnesota Iron Co.'s mines will employ 1,300 men the coming winter and men are being hired from the Marquette range to go there. From Negaunee, a delegation of men has gone to the Mesabi range. On the other hand, some Marquette range miners who went to the Mesabi are returning.

The Newport mine at Ironwood has stopped shipping for the season. The total for 1895 is 157,882 tons The Eureka has also suspended shipment.

At Escanaba, Northwestern ore dock No. 3 is to be rebuilt. It will be enlarged and will have four tracks.

The Penn Iron Mining Co.'s shipments for the season will reach 290,000 tons. Of this amount 100,000 tons is from stock.

Chicago men have leased the Hiawatha mine at Iron River, on the Menominee range and a hoisting plant capable of hoisting 750 tons a day will be put in. Northwestern track connections are under negotiation.

An air compressor is going in at the Fayal property and 10 drills will be operated through the winter. About 100,000 tons will be stockpiled.

THE Falcon Bronze Co., of Youngstown, O., has been incorporated with $10,000 capital. The directors are: G. B. Booth, president; John Tod, secretary and treasurer; G. A. Doeright, general superintendent and manager; Richard Garlick and J. H. Dunbar. The main building of the new plant will be 40x130 feet. The company will make furnace tuyeres and coolers, bronze and brass castings of all descriptions and all grades of Babbitt metal.

BIRMINGHAM, ALA., not having pledged the necessary fund to make up the difference on railroad expenses, the 1896 convention of the Amalgamated Association will be held at Detroit.

THE IRON TRADE REVIEW

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OCTOBER 24, 1895.

GROWTH UNDER HEAVY HANDICAPS.

The official report of tin plate production in the United States in the last fiscal year, just filed at Washington by Col. Ira Ayer, special agent of the Treasury Department, is interesting in view of the long official silence on the subject. What increase has been made in production? is the natural first inquiry. Over the output in the fiscal year 1894, it is 39 per cent, certainly a healthy growth under a cold-water tariff, for a year that had two months of nearly total suspension, from wage differences. As given elsewhere, the figures are quite full and the comparisons made are interesting; but in the subjoined table we have turned the production into gross tons, in the way tin plate imports are presented for statistical purposes:

TIN PLATE PRODUCTION IN UNITED STATES, 1892–1895. GROSS TONS.

Fiscal year.	Total production.	From home-rolled plates.	From foreign-rolled plates.	Per cent home-rolled.
1892	6,092	4,150	1,942	68
1893	44,561	19,463	25,098	44
1894	62,154	38,380	23,774	62
1895	86,518	71,686	14,832	83

The increase from 38,380 tons of American black plates coated in the year ending June 30, 1894, to 71,597 in the fiscal year 1895, is an achievement highly creditable to the new industry. The amount of foreign black plates brought over for dipping purposes last year was little more than half the average of the two preceding years. The discrimination of the Gorman tariff against the dipping industry had the result expected.

The computation of Col. Ayer as to the capacity of tin plate plants built and now building confirms what has been written in the past year, as to the entire adequacy of the works now either in operation or under construction, to supply domestic consumption, apart from plates that will be imported to be used in export trade. But whether this great capacity shall be actively employed and wages distributed to thousands of additional workmen to whom the prosperity of our tin plate industry would mean steady employment, depends largely upon the ability of its friends to secure a duty adequately protective. While steel billets are not expected to go again to the high figure reached in the boom, they are likely to stay well above the $15 and $16 basis which made possible the large production shown in Col. Ayer's report.

That a higher duty will come in the next two years is not at all probable. Yet if the report is true that some of the opponents of tin plate development now have the sublime audacity to claim the increased production of last year as a fruit of the new tariff, one need not be surprised at any change of heart.

THE STEEL-MAKING CENTER AGAIN.

In an authorized interview, published simultaneously by all the Pittsburg newspapers, Andrew Carnegie refers to Pittsburg's "lost supremacy as the cheapest site in the United States for steel-making," and says that "the Lake Erie manufacturer has so decided an advantage that if one were about to locate iron and steel works he would go there." Much stress has been laid upon these statements by the newspapers which have commented on them, and properly so. Mr. Carnegie has not announced a new discovery. He has not just now, for the first time, become aware of the advantages of the lake site for cheap steel-making. But it is significant that the controlling holder in the greatest steel company in the country should publicly direct attention to the passing of supremacy from the district in which his interests are centered. It is true, the object of the statement and of the arguments going with it is to set on foot measures to get back the position which has been lost; but the directness of the admission is the feature of the utterance that will attract most attention.

It will be noted in the extract, printed on another page, that Mr. Carnegie refers to the many times he has canvassed this question, and to the unvarying conclusion he has reached in other years that Pittsburg is the pre-eminent spot for steel-making. Now, he adds, he can no longer say this. It may be that his change of opinion has been more recent than with others who have gone over the ground. It is possible, moreover, that the actual construction of a large steel plant on the lake shore and of another at a point midway between Pittsburg and Lake Erie has aided in the crystallization of this conviction. The erection of a large plate mill in the Chicago district, with its resultant competition, and the plans for a structural mill at the same point, may have helped also to emphasize the advantages of lake sites.

At all events, the inference that Mr. Carnegie's conclusion, while not recently reached, is yet of comparatively recent date, is worth a word. The insinuation sometimes appears, that if the advantages of a lake situation are as great as claimed, the wonder is that those who for years have been in possession of them have not risen to the height of their opportunities and established a monopoly of their natural market. The examples so frequently presented in the period of low prices preceding last April, of the invasion of distant territory by steel mills and the taking of orders under the shadow of a well-equipped competitor gives partial answer. The various elements of modern equipment, effective organization, long study of labor-saving problems, the building up of special lines of production—all enter into the account. And vast plants involving large investments, and built up in years of prosperous business, are not in the habit of quietly lying down at the appearance of a competitor whose cost of assembling materials chances to be lower. Moreover, the foundations of Pittsburg's greatness as a steel center were established long before Lake Superior ores had become an important factor in steel production, and therefore before steel making on the lake shore had assumed any proportions. As recently as 1878, the total output of Lake Superior mines was but a trifle over a million tons. In the census year 1880, only 15 years ago, Pennsylvania produced more iron ore than the two Lake Superior ranges then opened—a total of 1,951,495 tons, against 1,908,475. With the Lake Superior region to-day

furnishing more than 85 per cent. of the Bessemer ores of the country, and only about 60 per cent. so recently as 1888, it can be seen how the factor of proximity to this ore supply has grown in importance in the past few years.

If we seek further reason for the emphasis recently laid on the lake shore site—a reason that did not exist when steel plants were first built there—we shall find it in the rapid lowering of the cost of the long lake haul in the evolution from the wooden vessel of light tonnage to the 4,000 ton steel freighters of to-day, with 6,000 ton vessels just ahead. The ore freight to Pittsburg, ranging from 90 cents to $1.05, and practically stationary in the past 15 years, has been in the past year a much larger percentage of the cost of a ton of ore laid down in Pittsburg furnace yard than ever before. Every decrease in the average lake freight on ore has thus amounted to an increase in the handicap upon the furnaceman at Pittsburg. While contract ore from Escanaba, for example, paid $1.85 lake freight in 1880, or about twice the rail freight from Lake Erie to Pittsburg, the condition is now reversed and Escanaba contract ore in the past three years has paid but half as much for the long lake haul as for the short rail haul to Pittsburg.

Mr. Carnegie's utterance may be taken not only as the statement of an existing condition, but as a prophecy. He says that new steel works seeking the site that will give lowest cost will go to the lake shore. But he does not say that the policy that, added to Pittsburg's natural advantages, has given it the strong position it holds and has made its mills unceasingly aggressive, will be relaxed one jot. The great furnaces now under way at Duquesne and the lavish expenditure of money to command every economizing agency are testimony sufficient on that point.

THE CLEVELAND DISTRICT.—Continued from page 3.

Superior charcoal has had a light sale the past week, with $15.50 to $16.25 as the range of quotations.

Finished Material.

An undercurrent of strength is more apparent in the market for mill products in spite of lower recent quotations in some lines. Plates have been the weakest market, the cutting starting with recent desirable orders from lake shipyards. On late small-lot business 1.65c and 1.70c Pittsburg has been done; rumors of lower prices are traced to transactions in grooved material, rolled on bar mills. There is a somewhat firmer tendency in all finished material in the past week and while mills are taking prompt deliveries on the basis of a fortnight ago, there is little disposition to take contracts far ahead at these prices. Structural material while in light demand is maintained at 1.60c@1.65c, Pittsburg. Rumors of cutting are heard but transactions below 1.69c Cleveland, for beams and channels cannot be verified. Railroad demand has been expanding. The Ann Arbor road has placed its order for several hundred cars. Axle makers and bar iron mills have had several orders in the past week traceable to new car business. Billets continue weak. In the absence of transactions, $22 is a fair Cleveland quotation on spot steel.

THE ROBERT-BESSEMER PROCESS.

The *Bulletin* prints the following letter, which it recently received from the superintendent of a company in the West which has recently been experimenting with the Robert-Bessemer process for the manufacture of steel castings:

"The Robert-Bessemer process is not, in my opinion, destined to play a very great part in the commercial manufacture of steel castings in the future, but for concerns desiring to make a limited quantity of castings for their own use it has a number of advantages over other processes. The tuyeres in the Robert-Bessemer converter being placed laterally near the top of the bath instead of at the bottom of the vessel, as in the Bessemer converter, make the use of a much less powerful blowing engine practicable and decrease the cost not only in the original outlay but also in the steam power necessary to operate the engine. The cost of ramming up bottoms, putting them on, and taking them off is also done away with, as well as the always necessary rig in a Bessemer plant for drying the bottoms. The repairs to the converter do not amount to any more than is required on the Bessemer converter if the tuyeres are properly placed when they are rammed in.

"These advantages are in a small measure offset by the higher waste of the Robert-Bessemer process as compared with the Bessemer, being, so far as I can judge, from charging the cupola to pouring from the converter in the Robert-Bessemer process from 18 to 20 per cent, and in the Bessemer process about 15 per cent. It stands for itself that the Robert-Bessemer process must have a higher waste than the Bessemer, as the same per cent of heat-giving elements is usually carried in both processes and are virtually all burned out by both processes, the Robert-Bessemer in addition burning much more iron than the Bessemer, owing to the location of the tuyeres, by which the blast comes in contact with only a small portion of the bath at one time. The carbon, silicon, and manganese not being present in sufficient quantities to fully satisfy the oxygen passing through the metal, the iron is next attacked. In the Robert-Bessemer process the indication of burning iron is much more marked after the carbon period has been reached than it is in the Bessemer process.

"The excessive burning of iron does not, however, seem to have the injurious effect on the bath that it has when the iron is being freely attacked in the Bessemer process, as the oxides formed are immediately taken up in the slag and do not seem to become intermixed with the bath.

"By the use of the molten addition at the end of the blow, to bring the product to the desired composition, much heat is saved and aids in pouring off the metal cleanly, as the dumping into the converter of a mass of cold addition, or even addition heated, requires that the metal be blown to such a high temperature, in order to take up such addition and pour without a scull, that it can not be but injurious to the bath. Another disadvantage of the cold addition is that it is much more difficult to get it well mixed into the bath and thus bring out a thoroughly homogeneous metal.

"The use of two vessels of an equal capacity would, of course, insure much more economical working than the use of but one, as the one vessel could be repaired and put in shape while the other was being used, thus doing away with the costly delays occasioned from this source. In fact this is almost a necessity where it is desired to get out a number of heats every day by this process."

A Russian Armor Plate Order for Homestead.

The Carnegie Steel Co., Ltd., has received St. Petersburg advices the past week that the Russian government has tested a plate of patent carbonized reforged steel that gave extraordinary resistance. It has therefore placed an order with the Carnegie Steel Co. for 1,100 tons. It is exactly the same kind of steel recently tested by the United States Government at Indian Head, where it broke the record. The price obtained is equal to that paid by the United States. Four or five months' work is thus guaranteed to the Homestead plant, which has about finished the orders for the United States Government.

T. P. KELLY & Co., 291 Pearl street, New York, are headquarters for foundry facings, blackings, plumbago and foundry supplies of all descriptions. An illustrated catalogue and price list, which foundrymen will find convenient for ready reference, will be mailed to readers of this paper upon application.

GRACE FURNACE of the Brier Hill Iron & Coal Co., Youngstown, went in blast again Oct. 22, having been out for relining only 30 days.

LATEST TIN PLATE STATISTICS.

SPECIAL CORRESPONDENCE OF THE IRON TRADE REVIEW:

WASHINGTON, D. C., Oct. 22.—Special Agent Ira Ayer was recently instructed to ascertain and report upon the condition of the tin plate industry in the United States, and has just submitted his report to the Treasury Department. It covers the operations of the fiscal year ended June 30, 1895, former reports having covered the operations of the three previous fiscal years, from July 1, 1891, to June 30, 1894.

The present report contains comparative statements, showing the quarterly production of tin and terne plates during each of the four fiscal years since the establishment of the industry, and the percentages of such plates produced each quarter from sheets rolled in the United States and from foreign-made sheets.

The facts presented show a marked increase in the number of mills for rolling black plates. The largely increased consumption of steel sheets from American rolling mills indicates not only the accelerated growth of this branch of the industry, but an actual preference for American rolled sheets, both for coating, and for uses to which the finished plates are applied. The report says:

During the fiscal year ended June 30, 1895, the production in the United States of commercial tin and terne plates, was 193,801,073 pounds, against 139,223,467 pounds produced during the previous fiscal year, showing thereby an increased production of 39 per cent. Of the production for the year, 160,576,934 pounds, or about 83 per cent, were made from sheets rolled in the United States, against about 62 per cent made from such sheets, of the production for the fiscal year ended June 30, 1894. The quantity of sheets used of American manufacture, during the last fiscal year, was 31,253,467 pounds in excess of the entire production of commercial tin and terne plates during the fiscal year ended June 30, 1894. The production for the year distributed according to weight and kind of plates was as follows:

	Lighter than 63 lbs. per 100 sq. ft. Pounds.	63 lbs. per 100 sq. ft. and heavier. Pounds.	Total Pounds.
Tin Plates	103,256,143	17,071,806	120,327,949
Terne Plates	62,934,216	10,528 908	73,473,124
Total	166,190,359	27,610,714	193,801,073

These figures show that about 86% of the production belong to the class weighing lighter than 63 pounds per 100 square feet; the proportion of the previous fiscal year having been about 95% of the production for that year. Forty-eight firms were producing during the quarter ended June 30, 1895, as against 40 during the corresponding quarter of the previous fiscal year.

The quantity of American sheet iron and steel made by stamping or other manufacturing firms into articles and wares which were afterwards tinned was 6,285,340 pounds. The production for the previous year was 6,268,263 pounds.

Black Plate Production.

The production of black plates in the United States during the fiscal year, stated by quarters, is as shown below:

Quarter Ended.	Lighter than 63 lbs. per 100 sq. ft. Pounds	63 lbs. per 100 sq. ft. and heavier. Pounds.	Total Pounds.
Sept. 30, 1894	26 681,855	5,570,511	32,252,366
Dec. 31, 189	16 801,660	8,805 543	25,607,203
Mar. 31, 1895	37 751,102	11,388,665	49,138,767
June 30, 1895	67,229,153	11 342,990	78,572,143
Total	148,463,770	37,107,709	185,571,479

Production, fiscal year ended June 30, 1895	185,571,479 lbs.
Production, fiscal year ended June 30, 1894	98,970,880 "
The difference is	86,600,599 lbs.

Showing an increased production of 37½ per cent.

The production of such plates lighter than 63 pounds per 100 square feet was 80 per cent, as compared with 82 per cent during the preceding year. Twenty-eight rolling mills were producing black plates during the quarter ended June 30, 1895, against 20 that were producing during the quarter ended June 30, 1894.

Consumption of American Plates.

"Of the 48 firms that were producing commercial tin and terne plates during the quarter ended June 30, 1895, 39 used wholly American plates, with an output of 60,399,254 pounds, nine used both American and foreign plates, with an aggregate output of 7,274,015, of which 2,720,355 pounds, or about 37 per cent were made from American black plates. No firm used wholly foreign plates. The proportion of American sheets used during the quarter ended June 30, 1895, compared with the entire production of commercial tin and terne plates, was 93 per cent, against 72 per cent used during the corresponding quarter of the previous fiscal year.

During the fiscal year ended June 30, 1895, eight firms (coating factories), permanently discontinued production, and their names have accordingly been dropped from the list of manufacturers. The names of such firms as have temporarily suspended production, but hold their plants intact, with a probability of resuming operations have been retained in the list. Twenty-six new firms engaged in the active business of building or building and production during the year, of which 17 are making or preparing to make black plates.

A summary statement shows that the number of firms engaged in tin or terne plate manufacture for the quarter ended June 30, 1894, was 57, less those dropped from the list as above shown eight, leaving of the said firms 49. The number of new firms added to the list, during the fiscal year ended June 30, 1895, was 26; formerly operating and restored to the list, one; total number of firms June, 30, 1895, 76; of which there were making or preparing to make black plates, 43; same, quarter ended June 30, 1894, 25. The number of firms building during the fiscal year ended June 30 1895, was 28; number building quarter ended June 30, 1894, two; leaving of new firms building as before shown, 26; number of new firms making or preparing to make black plate, 17; the number enlarging their plant during the year was 28.

Black Plate Mills and Tinning Machines.

The number of rolling mills (for rolling black plates) completed June 30, 1894, was 71; the number of mills additional, completed during the fiscal year ended June 30, 1895, was 78; total number completed June 30, 1895, 144; number building June 30, 1895, 39; completed and in process of construction June 30, 1895, 183. The number of tinning machines and sets completed June 30, 1894, was 207; number completed during the fiscal year ended June 30, 1895, 141; total number completed June 30, 1895, 343; number building June 30, 1895, 30; completed and in process of construction June 30, 1895, 378.

The following table shows exports, imports and home consumption:

Imports during fiscal year ended June 30, 189	513,963,401 lbs.
Total exports for same period	126,777,800 "
Showing net imports	387,185,601 "
Total domestic production	193,801,073 "
Approximate consumption in the United States	580,938,674 "

The annual capacity of mills completed June 30, 1895, (144) was approximately 450,000,000 lbs. The capacity of mills completed and in process of construction June 30, 1895, was about 570,000,000 lbs.

UNDER the new smoke ordinance which went into effect at Pittsburg, Oct. 1, the emission of more than twenty per cent of black or gray smoke from any chimney or stack where bituminous coal is used in connection with boilers for heating or power purposes will be deemed a public nuisance, and any such emission for a continuous period of more than three minutes' duration will be punished by a fine of from $10 to $50. The authorities promise a strict enforcement of the ordinance.

THE Huyett & Smith Mfg. Co., Detroit, is succeeded by the American Blower Co., whose officers are D. M. Ferry, president; A. E. F. White, vice president; James Inglis, secretary and treasurer. The personnel remains the same, except that W. D. Smith, vice president, withdraws. Mr. Huyett has not been connected with the company for 10 years. The American Blower Co. will carry on the old lines of manufacture—hot blast apparatus, dry kilns, fans, blowers, engines and all kindred machinery.

THE next regular dividend on the preferred stock of the Colorado Tool & Iron Co. is due in February and will be paid at that time. The company has funds which could be applied to the payment of the $240,000 arrearage, but the use of these funds in important improvements may postpone the payment of back dividends until the regular time.

UNIVERSAL MILLING MACHINE.

The design of a new line of universal tool-room milling machines, embodying new ideas in construction, is shown in the illustration, the machine being an 1895 product of the Cincinnati Milling Machine Co. Spindle power and strength of feed are two features in which the makers have striven for excellence.

The adjustments of the machine are taken care of in a way that requires the least time from the operator. The shaft for vertical motion is placed at an oblique angle and carries a clutch crank. This, with permanent handles on screws for cross and longitudional adjustment of the table, gives the operator control of adjustments without changing his position or shifting handles. Two adjustments may be made simultaneously. The cylindrical overhanging arm is used which, when in position, is rigidly clamped at two points. It is provided with an adjustable phosphor bronze bushing, forming a perfect cylindrical support for the end of the cutter arbor.

Through a mechanism at the back end of the spindle, twelve changes in the feed, progressing uniformly, are obtained for every spindle speed. A pointer on the end of lever shown indicates on a dial the feed at which the machine is being operated. Throwing this lever from one side to the other has the effect of doubling the feed or reducing it by one-half. No belts or pulleys need be removed to effect these changes.

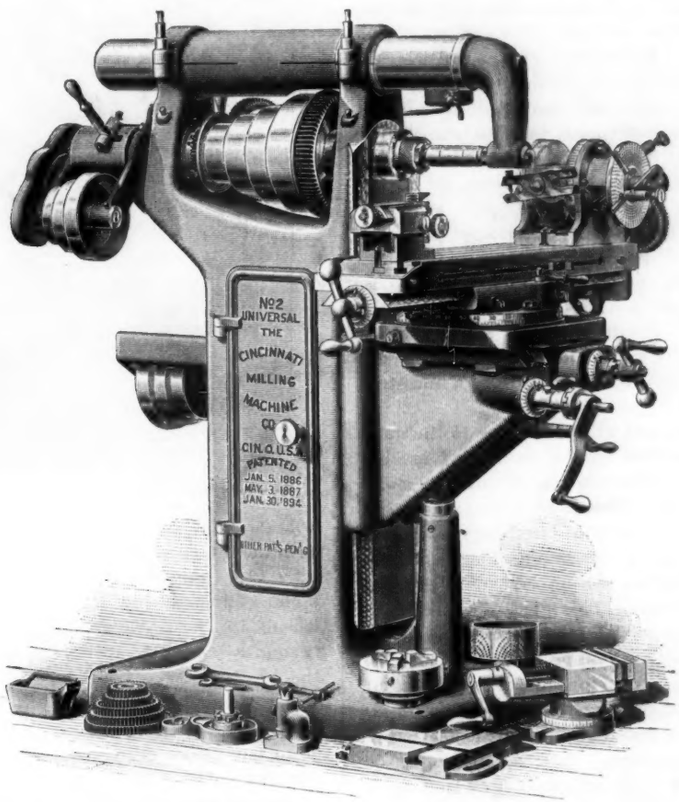
In addition to the automatic longitudinal feed to the table, there is an automatic cross motion in line with spindle. An automatic vertical feed can also be supplied. In the larger machines to facilitate adjustment by hand, the screw for vertical motion is provided with anti-friction bearings. All feeds are automatically tripped in either direction by a dog.

The circular form of the swiveling carriage for the table is of value in cutting spirals or in any work requiring the setting of the table at an angle. The swiveling carriage thus need not be drawn out from the face of the column as far as when it is square and a shorter cutter arbor can be used. The swiveling carriage always has its full bearing on the slide on top of the knee, no matter at what angle the table is set. The spindles are made of crucible steel and are hollow. The front bearing is cast iron, lined with babbitt metal.

The indexing head is so arranged that the swiveling block carrying the spindle can make a complete revolution. This gives the operator more choice as to the character of cut he shall make, and in cutting bevel gears, for instance, permits some cuts to be taken without tendency to dig into the work. By this arrangement also right-hand and left-hand cuts can be taken without changing the cutter. The block carrying the spindle is always fully contained within its support, and there is a device for locking the spindle while a cut is being taken, thus relieving the mechanism from strain. There is on this spindle a cup-shaped dial for rapid indexing. The tail stock has an adjustable center bar which is raised and lowered by a rack and pinion for taper work, and there are two centers formed upon the bar—one for the smallest work, the other for larger work. Indexing can be done up to 360, and there is a full set of change gears for cutting spirals.

Two sizes of this machine are built, the larger or No. 3 size having a length of platen feed of 27 inches; cross motion in line with spindle 7½ inches; verticle range 19 inches; working surface of platen 43x9½ inches; swing on index centers 21x12 inches; range of feed per revolution of spindle .006 inch to .15 inch. Its net weight is 2,800 pounds.

The makers, the Cincinnati Milling Machine Co., of Cincinnati, have been very busy throughout the year. The demands upon them have required the erection of an addition to their building, and the experience of representative shops with their late improvements gives promise that the added capacity will be likewise taxed to its full extent.



SECRETARY EVANS, of the Foundrymen's Association, Philadelphia, sends this notice of the postponement of the national convention of foundrymen: "From the fact that a number of our members will attend the Atlanta Exposition, Pennsylvania Day, on Nov. 14, and the meeting of the National Association of Manufacturers in Chicago, on Nov. 19, we have thought it best to postpone the meeting of the national convention of foundrymen until the early part of 1896. Ample notice will be given later."

H E. COLLINS & Co., Pittsburg, sole sales agents for the Cahall vertical water tube boiler, manufactured by the Aultman & Taylor Machinery Co., Mansfield, O., have made the following sales of Cahall boilers within the past ten days: Mahoning Valley Iron Co., Youngstown, O., second order, 300 h. p.; Sharon Iron Co., Sharon, Pa., second order, 500 h. p.; Phœnix Glass Co., Pittsburg, 75 h. p.; Citizens' Gas Co., Bridgeport, Ct., 330 h. p.; Isaac Harter Milling Co., Fostoria, O., 500 h. p.; Hainsworth Steel Co., Pittsburg, 500 h. p.

PITTSBURG'S LOST SUPREMACY.

While in Pittsburg last week Andrew Carnegie visited the Exposition and saw a model of the proposed ship canal to connect Pittsburg with Lake Erie. He made criticisms on some details of the project and these were reported in substance in the newspapers. Before going back to New York he gave out an authorized statement of his views on the necessity of a canal to assist in restoring Pittsburg's supremacy in low cost of steel-making and indicated the sort of canal he regarded most feasible. Mr. Carnegie does not favor a ship canal but a canal of moderate depth, and he would have the big freighters of the lakes transfer their cargoes at Lake Erie port to 1,000 ton barges. He figures that the cost of a canal of moderate depth would be $15,000,000, while a ship canal would cost far more. He assumes that the big lake freighters of 6,000 tons that are coming in the next few years will crowd out the smaller boats and that it is not the thing to build a canal for 2,000 ton to 2,500-ton vessels. The important part of the interview, however, and the portion of most interest to our readers is that which refers to the transfer out of the Pittsburg district to the lake shore, of the center of most economical production of steel. Mr. Carnegie advocates the ownership of the canal by Allegheny county, so that her manufacturers may get the benefit of the lowest possible water tolls. The object of the canal he says is "to restore to Pittsburg her lost supremacy as the cheapest site in the United States for manufacturing," and this could not be secured were the canal built by private capital simply as a business enterprise, because the shareholders would naturally put rates only enough below rail freights to get the traffic. We make extracts from the interview as follows:

"It has been my business to study the question of iron and steel manufacture in the United States, and often as I have passed in review the claims and advantages of the various points I have never failed to come back to good old Pittsburg, and say: 'Here is the spot.' I continued this study, and to-day I can no longer say this. I know it is not the case. Pittsburg is no longer the best point to manufacture iron and steel in the United States.

"The reason is easily given, and will be obvious to the dullest comprehension. It takes two tons of iron ore to make a ton of finished steel. It only takes one ton of coke to make one ton of steel or pig iron. Therefore, a manufacturing plant situated upon Lake Erie, north of Pittsburg, has not to transport by rail the two tons of ore at all; it comes to the manufacturer by water, and he has only to transport the ton of coke from Pittsburg to the lake. This gives the Lake Erie manufacturer so decided an advantage that if one were about to locate iron and steel works he would go there.

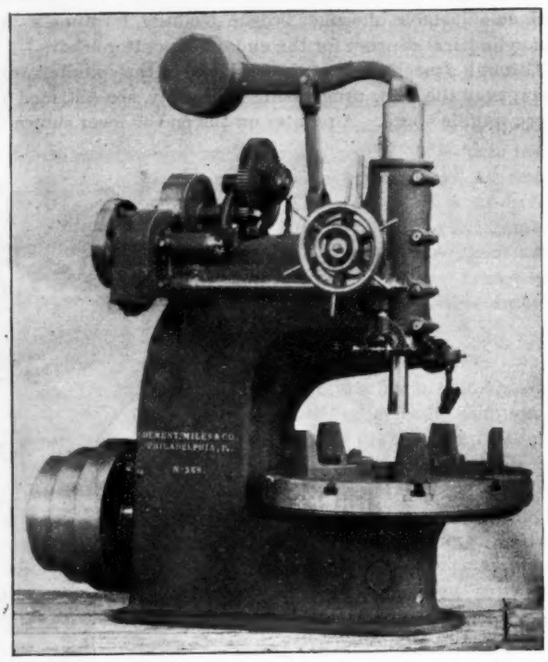
* * * "There are fully 5,000,000 tons of ore to be brought to Pittsburg to feed its present furnaces and those now building. Along the line we know that furnaces already existing will require more than 1,000,000 tons. Here we have 6,000,000 tons sure. Now, assuming that we only sent back loading to the half of this extent, 3,000,000 tons of coal, coke, etc., we have then, say 9,000,000 tons. A million more tons miscellaneous, such as limestone, etc., are sure, not in supposition, but here now.

"Assuming that the county of Allegheny owns this canal, and it says that 20 cents per ton shall be the toll upon the traffic, then we have $2,000,000 receipts. Some heavy freight railroads are worked at 50 per cent of their gross receipts. I am not an expert on canal maintenance, but I should say one-half of this, 25 per cent, would be ample and leave a margin. This, then, would amount to $500,000 a year, leaving a profit of $1,500,000. Say that the canal cost as much to maintain and operate as the cheapest railroad, which is absurd, and still we have $1,000,000 revenue from it. The liability of Allegheny county would only be $600,000. The fact is that Allegheny county could not only receive from the canal enough to pay the bonded interest incurred for it, but double that amount. She would have $400,000 surplus, but, beyond surplus necessay to improve the canal, her best policy would be to reduce tolls, as the surplus came.

"Now, what would 20 cents per ton upon ore mean to Pittsburgh? It costs $1.80 for two tons of ore to the manufacturer to-day. With the tolls at 20 cents the cost would be 40 cents. There would also be, say 5 cents a ton, greater expense stocking the ore from a barge than from railway cars at the furnaces. This would be 10 cents, a total for two tons of 50 cents. It would mean, therefore, that Pittsburg, in competition with Lorain, Cleveland, and the Lake Erie district, and with Chicago and all other points with which the competition is becoming more and more severe, was given the advantage of $1.40 per ton on every ton of steel manufactured."

48-INCH CAR WHEEL BORING MACHINE.

The machine shown in the illustration is made by Bement, Miles & Co., Philadelphia, and contains a number of important improvements which make it especially efficient for car wheel boring. It is designed for boring and facing car wheels at one operation. Its capacity is 80 wheels bored and faced, in 10



hours. All details are arranged so that work can be handled with great facility and rapidity. The swing is 49″ in diameter. The cone and gearing give six changes of speed to the table. When, owing to variations in the hardness of the wheels, it is desirable to change the speed at which the roughing cut is being taken, this can be done instantly by shifting the belt.

The spindle of the table is of large diameter and is provided with adjustable bearings, in addition to a broad horizontal annular bearing which ensures steadiness when taking the heaviest cuts. The chuck for holding the wheels has five connected jaws, concentric and eccentric, all operated together by a hand lever from the top of the table. These jaws can be quickly adjusted for any size wheel not over 42″ inches in diameter, by slacking one bolt on each jaw, sliding the wheel into position and reclamping. The boring spindle is 7¼″ in diameter and has 24″ vertical traverse. The spindle is counterweighted and provided with rapid hand movement and four automatic feeds. These feeds can be changed instantly, while the machine is running, by means of a sliding clutch pin. The spindle bearing has ample adjustment for wear. The boring mandrel is keyed into position and feeds into a taper socket at its lower end.

The wheels are handled by means of a power crane which is placed in a convenient position on the back of the machine. A self-feeding hub-facing attachment and chill turning device can be provided if desired.

Bement, Miles & Co. are represented in Chicago and the West by Mr. Chas. E. Billin, 1534 Marquette Building, Chicago, who will be glad to give any further information concerning their machines.

STOCK in the Americon Pig Iron Storage Warrant Co.'s yards Oct. 20, 1895, was 111,700 tons, 600 tons having been withdrawn in the preceding 10 days and none put in.

THE WESTERN FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Western Foundrymen's Association was held Wednesday evening, Oct. 16, at the Great Northern Hotel, Chicago. The president, Mr. John M. Sweeney, occupied the chair. The following members were present: J. M. Sweeney, Chicago Consolidated Iron & Steel Co., Harvey, Ill.; W. N. Moore, Joliet Stove Works, and John Pettigrew, Illinois Steel Co., Joliet, Ill.; F. M. Lyon, Burlington Route Foundry, Aurora, Ill.; L. W. Lukens, Illinois Malleable Iron Co., Chicago; J. T. Rowlands and Peter Chalmesr, J. I. Case Threshing Machine Co., Racine, Wis.; Leo Salomon and W. E. Salomon, Chicago Architectural Iron Works; Wm. D. Klipfel and Frank J. Klipfeld, G. M. Davis & Co.; D. De La Fontaine and E. W. Smith, Crane Co.; O. J. Oehring, Western Electric Co.; J. W. Hughes, Weir & Craig Mfg. Co.; J. A. Brady, Kurtz & Buhrer Mfg. Co.; A. M. Thompson, Link-Belt Machinery Co.; S. T. Johnston, Whiting Fdy. Equipment Co.; E. E. Hanna and Wm. Ferguson, Gates Iron Works; Jas. Fyfe, Pickands, Brown & Co.; H. S. Vrooman, Garden City Sand Co.; O. T. Stantial, Illinois Malleable Iron Co.; A. Sorge, Jr., M. E.; B. M. Gardner, *Iron Trade Review;* W. S. Hemby, *Journal of Commerce*, Chicago.

The following applications for membership were read and the applicants unanimously elected members of the association: Belle City Malleable Iron Co. and Belle City Mfg. Co., Racine, Wis.; Eugene W. Smith, of Crane Co., and Joseph T. Ryerson & Son, Chicago.

The president announced that under unfinished business, further discussion was in order, of Mr. Sorge's paper on foundry cost accounts, presented at the Milwaukee meeting, the discussion having been adjourned from that meeting.

Mr. Thompson: I would like to ask Mr. Sorge to give us an example of how he would figure up the costs of castings—say 500 pounds—on which the labor of molding was $2.50.

Mr. Sorge: I would like to answer that by simply referring to the last paragraph of the paper.

'In order to obtain the cost of any individual casting, the date when shipped is looked up, and from the daily product sheet the date of casting is determined. The molders' and core-makers' tickets for this casting are then taken from the files and the direct labor is determined from them, as well as the weight from the daily product-sheet. If the casting was made from the average mixture, then the cost of the melted iron is determined from the table giving costs of materials per pound of good castings produced. This is added to the cost of direct labor and to the sum are added the cost per pound for indirect labor, material and expense, multiplied by the weight of the casting. The final sum gives the actual cost of the casting. It will be found that the indirect items of cost do not vary materially from one period to the next, and therefore these amounts taken from the period preceding that in which the castings were made will give very accurate results.'

I wish you would put the question in writing. I am afraid it would take up more time than I could give to it now, to take up an individual casting as to each item of indirect cost. There are three factors—labor, material and expense. But we divide these into direct and indirect labor, direct and indirect use of material, and expense per weight and expense per hour of labor.

Mr. Thompson: Could not all these factors be massed into one factor, instead of having a great many different factors for different classes of work?

Mr. Sorge: There are not many different factors. There are two items that are determined accurately upon which exact cost is kept. These are the exact labor and weight of the casting produced. On these the proportion of all items is based. So you have two proportions to go through. Of course you have a number of indirect items that have to be proportioned one way or another. There is difficulty in proportioning all indirect items according to one thing or another. They do not vary according to any one item. In some cases the indirect items of labor and expense will vary according to the weight and in other cases they will vary according to the visible amount of labor. If we could proportion everything according to just one item, of course it would simplify things.

Mr. Sweeney: What proportion is made in this method of keeping costs to arrive at the cost of stock-cores which are made in special pieces of work?

Mr. Sorge: I spoke of these in the article preceding this paper. There are two ways of getting at that. You can either determine the cost of stock-cores periodically, or determine the cost according to the coremakers' time employed on the special cores.

The Secretary read the following letter:

PITTSBURG, PA., OCT. 7, 1895.

Mr. S. T. Johnston Sec'y Western Foundrymen's Association, Chicago, Ill.

DEAR SIR: Your favor of the 3d to hand, inviting me to lay before your body for discussion, any question which might prove of importance in foundry practice, and I shall proceed to avail myself of your kind invitation.

In a recent issue of the *Colliery Guardian*, of Manchester, Eng., appeared a contribution on the benefits of ferro-sodium in obtaining small clean castings from the most worthless scrap. An extract from this article was published in the last issue of the *Machinery Molders' Journal*, and it has brought forth the inquiry from one of our subscribers, "What is ferro-sodium and where can we obtain it?"

Ferro-sodium would indicate an alloy of iron and sodium, but in what proportions? Upon investigating the subject I find that none of the standard works on chemistry and metallurgy mention such an alloy, or indicate in any way that there exists a possibility of the alloying of these two metals, whose specific gravity and melting points are so radically different. Still, as most of the authorities on chemistry confess ignorance on the possibilities of alloying sodium with the heavier and denser metals, it is possible that an alloy of iron and sodium may be made and that it may be of value in purifying and refining the poorer grades of iron. If so it is a subject well worthy of investigation by your association.

I have suggested to my correspondent that he experiment with ferro-sodium by attempting an alloy of these metals in the proportion of iron 90% and sodium 10% and casting the same into bars to be used as the basis of further experiment. By a comparison of the fracture of these bars with test bars of the common grey iron mixture it would be possible to determine whether a chemical or merely a physical combination of these two metals had been effected. Further experiments could then be made with the ferro-sodium thus obtained by test bars cast from an admixture of 5%, 10%, 15% and 25% to the ordinary mixture, or better still to a mixture of common scrap. A physical and a chemical examination of these test bars would demonstrate what, if any, benefit resulted from the use of sodium in iron.

If you think the subject worthy of discussion at the meeting of your association, you may lay it before your next meeting.

Truly yours,

W. E. WILKES.

Mr. Johnston: I sent a copy of this letter to every chemist connected with our association and asked him to let me hear from him. I have one reply, from Mr. Hollis, which is as follows:

CHICAGO, ILL., OCT. 12, 1895.

DEAR SIR: Replying to your favor of the 10th enclosing copy of letter from W. E. Wilkes, I would say that I never heard of such material as "ferro-sodium," neither can I form any idea of what could be meant by such a name. Under these circumstances you will see that it is well for me to keep out of the discussion. Yours very truly,

H. L. HOLLIS.

Mr. Stantial: I received a letter from Mr. Johnston and, like Mr. Hollis, I do not know anything about it. I passed the letter over to my friend Mr. George L. Norris, chemist, of St. Paul, with the request that he would give me his views on it, promising to give him credit for it before the association. He replies as follows:

'Your letter of the 10th is the first intimation I have had of an alloy of iron and sodium. I have looked through the journal of the Soc. Chem. Industry and find no trace of it. I would say that iron and sodium might be alloyed by means of heat and electricity together, using sodium hydrate as the electrolyte, in an analogous way to the formation of lead and sodium alloys. Such an alloy, I would suppose to be too expensive to use in the manner indicated. Its action would simply be that of a purge, due to the great chemical activity of the sodium. The sodium would not of itself give any physical properties to the castings. As sodium oxidizes so readily, its main action would be the removal of the oxides in the iron by reducing them. The oxide of sodium formed, would in turn combine with the slag present, rendering it very thin and fluid. The sodium would also combine with the sulphur present, to some extent, and act as a desulphurizer. There seems to be considerable work being done on such alloys, most of which are formed electrically, and no doubt some of these alloys will come to use in the foundry in special cases, but not for ordinary work.

You see I am giving my opinion on the assumption of ferro-sodium being an alloy. It is possible that sodium ferrate may be the true name of the substance. However, I do not believe that ferro-sodium can be cheap enough to use. In my search I ran across ferro-zinc, which the patentee suggests would be of use in deoxydizing steel."

In a later letter Mr. Norris says:

"I am more than half inclined to believe that sodium-ferrate is what is meant and that melted caustic soda or carbonate of soda in the ladle would do as much good as ferro-sodium. Let me know what you learn of the matter at your meeting."

Mr. Sorge: I do not believe there is such a thing as ferro-sodium; neither do I believe that it can be produced very well. I think the suggestion that there may be something of the nature of sodium ferrate is an acceptable solution. The sodium is going to act as flux and will remove some of the oxides, but I think we may just as well use some rock salt. I think if we did use much of it there would not be much lining left in the cupola.

Mr. James A. Brady read the following paper entitled

The Modern Jobbing Foundry:

A large percentage of our jobbing foundries are owned and operated by manufacturers of specialties whose only excuse for embarking in a business of which they know next to nothing is that they are compelled to run a shop in self defence because it is impossible for them to get their castings as promptly or as well made as they can make them in their own foundry. Admitting that this is the fact, whose fault is it? Does not the manufacturer when giving his order to the foundry fix the grade of his castings by informing the foundryman that he must have his castings made for so much per pound? The foundryman is obliged to give him work and material that will suit his figures. Let me say here that if the manufacturer would pay the foundryman what it actually cost him for his castings when made by himself, he would not have any reason to complain of the quality of his castings or the promptness with which his orders would be filled.

Again, your manufacturer is a very unreasonable person. He will bring his patterns to the foundry at all hours and insist upon the foundryman putting them in the sand at once, no matter how late the hour; or you have to keep the blast back to finish his piece and every one connected with the foundry has to go home to a cold supper. Should you drop into his factory a few days later the chances are that not one piece had been touched. Again he will want the foundryman to make him some special castings without allowing him the time necessary to rig up his flasks, etc., as they should be. You try to accommodate him with the usual result—a poor casting, which he is sure to reject.

This is a fair sample of the manufacturer who starts a foundry in self-defense and undertakes to show you how to run a first-class, "up-to-date" foundry and at the same time end his troubles as far as poor castings and promptness are concerned. The chances are there is a basement in his factory that is so dark and damp it is only used as a storage room for old rubbish. The very place for a foundry. Of course molders do not need light and air! So he has his basement cleaned and put in shape for his "modern foundry." After securing the services of a first-class foreman, wages $3 per day, and getting a cupola, fan, etc., set up, he buys some sand and iron and is all ready for the first heat.

But on looking over his bills he finds he has invested twice as much money as he originally figured on. He is subject to some troubles all new foundries meet with and finds that after all that it is not so easy to make good castings and turn them out promptly as he thought. Some one is to blame and he fixes on the foreman as the guilty one. So he discharges him and tries another one, but with no better success. After a few days of this kind of experience, other trouble stares him in the face. His business is dull or perhaps he is overstocked with castings. Yet, he is using more or less castings every day and can not shut down his foundry. He must do something. And right here is where he hits the foundryman a body blow. He will call upon some of his friends who are using castings and see if he cannot get some of their castings to make.

He does not care about the price. All he wants is enough to cover the visible cost. He is running his foundry for his own accommodation; and not satisfied with that he is anxious to accommodate his friends and the public by making their castings at cost price. But he soon tires of that kind of business and in a short time he is anxious to make his foundry pay; just as the regular foundryman is. He has made his prices so low that it is hard work for him to ask and get a price that will pay, because at the same prices the regular foundryman will get his work every time. And why not? Does not the foundryman devote his whole time and attention to your work? It is his business and not a side issue, as is the case with the specialty manufacturer. The shrewd business man will patronize the regular foundryman every time.

Discussion of Paper.

Mr. Stantial: I believe we have got hold of a great many of these jobs on which prices have been made similar to those in Mr. Brady's paper. Parties have been making them that know nothing about the cost.

Mr. Sorge: I think Mr. Brady has made a point very well in the paper. At the same time I think there is another one that might be added to it and that is that these manufacturers of specialties are so much more willing to accept poor castings out of their own foundries and yet are not willing to accept them from a foundryman. If you go into these specialty places you will find there is many a hole plugged up that they would not allow at all from an outside foundryman. But we all hate to tell stories out of school.

Mr. Moore: There is another thing that the paper suggests; that is, what is the foundryman going to do about it? Patterns are brought to a reputable foundryman and he is asked to make them for the same price that somebody else is making them for. The buyer naturally wants the good castings at the poor price. I do not know whether any one has ever had any experience of that kind. It has fallen to my lot and I think some others may have had the same experience, and I think it would be interesting to know what they do under these circumstances.

Mr. Stantial: I agree with Mr. Sorge that a man that is making his own castings specially is not as apt to blame himself as he is to blame an outside foundryman for giving him poor castings. He will overlook his own poor castings, but not the outside foundryman's. I have had a great deal of experience in the line that Mr. Brady suggests with patterns brought in that must be made that day and must be delivered the next morning. It puts your foundry back, it puts your heat back, keeps your men and holds your teams. You sometimes have to hire outside teams and perhaps the profit on the castings is 25 cents. These castings will cost you up into dollars. It is only a matter of accommodation with you to hold that man's trade.

Mr. Thompson: Is it not the case that those manufacturers who wish to make their own castings put up nice foundries rather than use basements? It is the foundryman that makes castings for everybody that has that kind of a foundry. When a manufacturer has enough work to run a foundry of his own, as a general rule he gets out a fine equipment.

Mr. Stantial: I have one case in mind right here in Chicago. It is a large concern and they have very well equipped foundries with everything right up to time. For the past four or five years the head of that concern has been complaining bitterly about costs. By the way, this concern figures costs accurately, and it has been a question whether they would not shut their foundry down and get their castings outside. They pour from 30 to 40 tons of iron per day the year round. They claim they can buy their castings outside, shut down and save money.

Mr. Moore: Are they accupying valuable ground space?

Mr. Stantial: It is becoming valuable.

Mr. Moore: It seems to me a discussion of that paper with a view to suggesting a proper method of charges for jobs would be quite valuable. If some of those who have methods of computing their charges against jobs that come in would present them it would be interesting.

Mr. Ferguson: There is a way of overcoming that in jobbing houses, I think. I remember an instance where I had charge of a foundry that was strictly jobbing. They were bothered to death with jobs coming in at all times. We established a rule that all jobs that must be cast that day must be in at one o'clock unless it was some extraordinary occasion. It worked very nicely.

Mr. Moore: How did you compute your costs against these castings?

Mr. Ferguson: In the regular way, at the regular rates.

Mr. Lukens: When you made the rule for one o'clock, were there any other foundries close to you?

Mr. Ferguson: There were other foundries in the same town.

Mr. Pettigrew: I think it is a very good way to charge for work that comes in and must be done at once—by the pound for the casting, and the molders' time. The majority of the work is hard to get along with. There is excitement all around, and the probability is that the casting is spoiled. The question comes to my mind, who has got to lose the price of the casting, the foundryman or the buyer that comes in a hurry? I believe the buyer ought to lose it.

Mr. Sorge: I think Mr. Pettigrew's remarks are correct. There is another element, and that is the question of the patterns that are furnished. They are generally made in a hurry, and are all out of shape.

Mr. Pettigrew: If a man comes in a great hurry for a piece of work he ought to be able to pay for it. I think a foundryman that would take such a job on the footing of regular prices ought to lose on it.

Mr. Hanna: I have had several years' experience in jobbing foundries, but it is the same with that as with everything else; it simmers right down to the question of personal judgment about what a man should charge for any piece of work. Judgment based on experienc. We simply charge for the molder's time and the usual rate for casting besides. I don't know that I ever charged for the time the molder put on when he lost a casting. I don't remember that I ever could, because if the casting is lost that night, you have all the next day to mold it again.

Mr. Thompson: I would like to ask Mr. Hanna if the molders work over-time?

Mr. Hanna: They work ten hours. If they work 15 minutes over, they are paid for it. The molder is supposed to be in the shop and at work ten hours per day. They come at 7 o'clock, out at noon, in at 1 o'clock and out at 6, and the molder is supposed to be at work all the time. If he gets through his work, he finds something else to busy himself about until 6 o'clock. If he has occasion to be later than 6 o'clock, he gets paid for that time.

Mr. Thompson: It is a question with me whether a man can be profitably employed after his work has been done. As a general rule, these things even up. Sometimes the men have to stay late.

Mr. Hanna: It seems to me to be the only fair and equitable way of running my shop. There is no reason why a molding shop should be run differently from any other, except the matter of opinion or custom.

Mr. Thompson: It would probably be all right if they were all run on the same principle. It is a question on which there is room for a good deal of discussion, and I think it would be very valuable for the foundrymen in Chicago to adopt a universal system in that respect.

Mr. Rowlands: I should like to ask Mr. Hanna if they have any set day's work in their shop?

Mr. Hanna: No, sir. We have so little work that is done the second time in succession, it is hard to set a day's work. Most of our work is very heavy.

Mr. Rowlands: Suppose the foreman is satisfied that a man has done a good day's work, and the superintendent says he must work until seven?

Mr. Hanna: The superintendent has nothing to do with the man.

Mr. Rowlands: I should like to ask Mr. Ferguson if he would consider that a proper way in a shop where they are accustomed to piecework.

Mr. Ferguson: I should think so. You want to get the full capacity of the labor.

Mr. Stantial: I want to ask Mr. Hanna, taking his remark that the superintendent has nothing to do with judging what a man's work should be, how he would manage in making the charge for a piece of work? The superintendent knows what the job is taken at. He knows what the job is costing. A certain molder is doing that job, and he makes it appear that he is doing a day's work. Would the foreman allow the work to go ahead at a loss?

Mr. Hanna: I should think the superintendent was not attending to his business unless he suggested to the foreman that something was wrong. He should consult with the foreman. But when it comes to saying which man shall do this work, or how much this man shall do, I think it lies with the man immediately over the molder. I believe in consultation and taking the advice of all that are interested in the work—even going so far as to ask the man that is doing the work. The question has been asked if it were wise to take a piece of work at the price that it had been done for by some one else or let it alone. It is simply a question of knowing what your work costs you. A shop doing jobbing work should know what different classes of work cost. I see no reason why a person running a jobbing shop should not be able to judge by his past experience very accurately what a job should cost. Then taking it or letting it alone is simply a matter of backbone.

Mr. Moore: If the foundryman has also a machine shop he charges in the machine shop so much an hour and so much for material. Now, in the foundry, I believe in the majority of cases the work is sold by the pound. Why does he not do the work in the machine shop by the pound?

Mr. Sorge: I think the explanation of that matter is that usually in the foundry the labor cost is included in the pound cost of the casting. Instead of saying a piece of work has cost so much, we say it has cost so much a pound to make it. You can find machine shops that finish machines by the pound. I could tell you of boiler shops that make their boilers by the pound. It is done not only in foundries but in every department of work. We have to have some basis of comparison, and that is the one that can be absolutely relied upon.

Mr. Brady: I have tried for twelve years in this city to charge for time work on experimental castings and pattern castings. I thought it was the only just way, but I have found very few parties who did not enter a very vigorous protest. I argued the point with them but they never heard of such a thing in the foundry and I could not establish that custom. It was not universal and it did not take at all. I try to get it out by charging them so much a pound.

Mr. Hanna: I think it is simply a matter of custom that somebody started, and we have all like sheep, followed it.

Mr. Moore: I do not know how much the early manufacturer of stoves may be responsible for general foundry practice; but perhaps it was of more relative importance in the early days than at present. It used to be the custom to pay the molders so much per pound for the finished stove, and the stoves were sold at the warehouse for so much per pound. I have sometimes wondered whether that was the foundation of the whole thing, or whether it arose from other sources.

Mr. Oehring: The paper that Mr. Brady read here is a very able paper in my mind, and I would say that it is very suggestive in many directions. But I would like, rather than to discuss it this evening, to put my remarks on paper for some other meeting.

Mr. Stantial: In doing special jobbing, I have found that it is better to charge by the piece than by the pound. If you give a pound price to the customer he finds it rather high, but if you give him a piece price it will go through, as a rule Jobs sometimes come in that you do not want to be bothered with, and if you put a pound price on them they would count up 25 and 50 cents per pound. The customer will naturally say no; but throw it into a piece price and nine time out of ten it will go through.

Mr. Hanna: He may not know what it will weigh; but he knows what one piece will cost.

Mr. Vrooman: I do not run a jobbing foundry; but I see a good many of them. About the question of prices and each foundryman cutting them down, I think the man that has the work done does more cutting than the foundryman. Each man in his own way thinks that he can make better work than somebody else, and it is right that he should.

Mr. Salomon: I would like to get a little information tonight. In our foundry we have a great many patterns of the same kind. When we put a new molder to work on a pattern it is not long before he finds out how many make a day's work. I want to know if the molders tell a new molder how much a day's work is.

Mr. Stantial: It is usually in the air around our works.

Mr. Moore: I think the question could be answered by putting it in another way. Did any one ever know a molder to be interested in increasing the foundry output?

Mr. Sorge: I would like to answer that by a paper read by Mr. Taylor at the Detroit meeting of the A. S. M. E. on a piece-price system. The Secretary has the paper.

The meeting then adjourned.

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INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants:—

[If you are in need of machinery of any description, please notify *The Iron Trade Review* and we will put you in communication with our advertisers at once.]

Machinery is wanted for a small machine shop. P. O. Box 291, Brunswick, Ga.

At Raleigh, N. C., the Allen & Cram Machine Co. has been incorporated with a capital stock of $10,000.

The Clifton Iron Co., Ironaton, Ala. will buy second hand cast iron pipe from four to ten inches in diameter.

A charter has been granted to the Kidd Bros. & Burgher Steel Wire Co., of McKee's Rocks, Pa., with a capital of $50,000.

Angus M. Smith, 737 Talleyrand avenue, Jacksonville, Fla., is in the market for a fifty to sixty horse-power engine and boiler, new or good second-hand.

The Scofield Bolt Co., of Anderson, Ind., has been incorporated, with a capital stock of $120,000. It will operate what was known as the Fowler Bolt Works.

The Standard Scale & Supply Co., Pittsburg, Pa., will buy a shear to cut one and one-half inch round iron and steel; emery surfacer; upright drill with 25-inch swing and back gear, and power hammer, fifteen and twenty five pounds.

The Elmore Drill Co., of Dubuque, Ia., has been incorporated with a capital stock of $100,000. The concern will manufacture mining and other machinery, drills. Its board of directors consists of W. J. Young, Jr., H. P. Dickinson and E. W. Grievish.

Additions, Enlargements, Removals, Etc.:—

The Munger Bicycle Co., Indianapolis, Ind., is erecting buildings that will give 20,000 additional feet of floor space and increase the number of employes from 120 to over 200.

The site of the Lloyd Booth Co.'s office at Youngstown will be included in the extension of the company's foundry and machine shop. A new and larger office will be built elsewhere.

The plant of the Sayre Metal Works, at Waverly, N. Y., is being enlarged by an addition to the main building. The capital stock is to be increased to $100,000, and the concern will soon double its present number of employees.

The Bright Star Foundry Co. will remove to Saginaw, Mich., from Hemlock City, and will occupy a building 60x200 feet, which is to be erected as quickly as construction can be pushed. James Wachalac is manager. Gray iron and brass castings will be produced.

The Sylvan Steel Co., Davenport, Ia., is erecting an addition to its rolling mills, 225x420 feet, to contain a second train of 16-inch rolls, for rolling plow beams, rounds and flats, light rails, etc. The new eight-inch train has just been completed and started. A 40x160 foot building is also to be erected as a scrap shed. The officers of this company are gratified at the results of the first year's business, which realized a handsome profit.

The F. W. Miller Mfg. Co., of Caledonia, N. Y., makers of agricultural implements, will soon remove to Le Roy, N. Y. The business has increased rapidly of late and the new plant will be greatly enlarged. Work on the buildings for it will be commenced immediately. The company will employ about 20 men in the manufacture of bean cultivating and harvesting machinery, besides running a foundry and machine shop.

The Western Electric Co., of Chicago, is making another extensive addition to its factory. It is to be used for heavy machine work and the new types of dynamos and motors will be finished there. The original factory of the Western Electric Co. was long since outgrown and the stove works of Collins & Burgie next door were purchased and turned into shops. The demand for space has again become so great that the new building was necessary. When this is completed the works of the Western Electric Co. will cover 104,000 square feet of space. The new factory building is 180 feet long by 50 feet wide, eight stories high, fireproof and of steel construction. The building will accommodate a traveling crane, with a span of 25 feet, which will run the entire length of the building takes up the basement and first story. This will be used for handling the heavy castings used in the new types of dynamos and motors. It is expected the building will be finished by Jan. 1, 1896.

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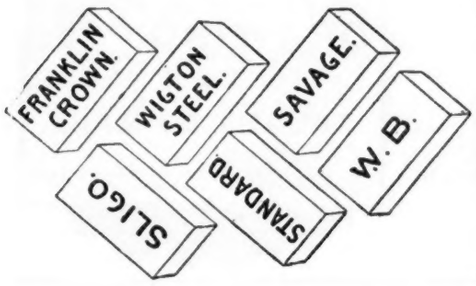

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New Construction:—

C. A. Henry has begun the erection of a machine shop at Waterloo, Wis.

The National Mfg. Co., of Little Rock, Ark., will establish a machine shop at Huntsville, Ala.

The Granger Foundry & Machine Co., Providence, R. I., is building a new machine shop 110 x 306 feet.

Work has been commenced on the new machine shop at the Winslow mill, Waterville, Me. The building will cost $20,000 and be 180 by 90 feet.

The Atchison, Topeka & Santa Fe is to build car repair shops at Argentine, Kan. One building, 120 feet by 280 feet will be put up now and a car-wheel foundry will be added later. The present roundhouse will be much enlarged.

Sealed proposals will be received at the office of the supervising architect, Washington, D. C., until 2 P. M. Nov. 1, 1895, for all the labor and materials required to put in place complete the steel and iron work of the U. S. Post Office, Court House and Custom House, Milwaukee, Wis., above the attic floor.

The Berlin Iron Bridge Co., East Berlin, Conn., has lately completed for Wilmot & Hobbs, of Bridgeport, Conn., a new rolling mill to take the place of the one lately destroyed by fire. The main mill is 126′ wide and 200′ long with engine and boiler room attached in a separate wing 54′ wide by 90′ long. The construction is entirely fire proof, no wood being used about the building, so the risk from fire is absolutely eliminated.

The Pennsylvania is to make important enlargements of its car and repair shops at Edge Moor, about five miles from Wilmington, Del. The company has purchased a large tract of land at that point, and it is claimed that the improvements proposed will cost altogether about $600,000. The work will be started this year and the plans carried out gradually. The new shops will be used for building cars as well as for general car and locomotive repairing.

Fires and Accidents:—

At Steelton, Pa., Oct. 20, five men were seriously injured by the falling of the iron roof of the casting house at one of the

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Experts pronounce this invention most valuable, furnishing an inexpensive method for utilizing the soft and waste ores and thus reclaiming a large percentage of the most superior minerals.

For terms, machinery, territory, etc., address

Acme Mineral Nugget Co.,

M. NIRDLINGER, Pres. **360 Farwell Ave., MILWAUKEE, WIS.**

Pennsylvania Steel Co.'s furnaces. The collapse of a wall caused the accident.

A large steam pipe burst at the American Wire Nail Co.'s mill, at Anderson, Ind., Monday, Oct. 21, and eight men were injured, one fatally.

General Industrial Notes:—

The remaining stack of the old Himrod furnace at Youngstown is being torn down.

The Kimberly Rolling Mill at Greenville, Pa., has been shut down for the past two weeks.

The Gracey Woodward Furnace Co., of Clarksville, Tenn., has decided to blow in the furnace.

The Weimer Machine Works Co., at Lebanon, Pa., has advanced the wages of its employees 10 per cent.

Bear Spring furnace, at Bear Spring, Stewart Co., Tenn., has blown in. It makes cold blast charcoal iron.

The Niles Tool Works Co., Hamilton, O., has a contract for eight heavy iron planers for a Brooklyn company.

The Ohio Falls Iron Works, at New Albany Ind., is to start its 8-inch guide mill, which has not been run for two years.

Fire has been lighted under the boilers of the Finished Steel Co., Youngstown. Considerable machinery is still to be installed.

The plant of the Aschman Steel Casting Co., at Sharon, Pa., resumed last week, having been rebuilt after the fire of two years ago

Belfont Furnace, of Belfont Iron Works Co., Ironton, O., which is being relined, will be ready for blast early in November.

The Clifton Iron Co., of Ironaton, Ala., has given up the manufacture of charcoal pig iron and will hereafter produce coke iron.

The Pennsylvania Steel Co., of Steelton, Pa., has leased the Lochiel furnace, at Harrisburg, which has been idle for several years.

It is reported that the furnace of the Bellefonte Furnace Co., at Bellefonte, Pa., and the ore mines near by will be put in operation in November.

The old Cambria Furnace, near Hollidaysburg, Pa., owned by the Cambria Iron Co, of Johnstown, Pa., which has been idle since 1892, is being made ready for blast.

The Elk Rapids Iron Co., Elk Rapids, Mich., will put its furnace in operation again in May, 1896. The present shut down is the first, except for repairs, since 1873.

The Kurtz & Buhrer Foundry Co., Chicago, is fitting up its foundry so as to make heavier castings than heretofore, in stalling a powerful modern crane and a new blower.

At New Castle, Pa., a three-days' idleness of the Red Jacket furnace ended in the strikers returning to work, the top filler over whose case the trouble originated being reinstated.

The Diamond Machine Co., Providence, R. I., will make an exhibit of its ball bearing grinder and other machinery at the Stanley Cycle Show to be held in London, Eng., in November.

The Wheeler Boiler Co., of Sharon, Pa., is now erecting a 325 h. p. boiler for the Paxton Furnace Co., of Harrisburg, Pa., and the second 300 h. p. boiler for the Thomas Furnace Co., of Niles, O.

The Star Tin Plate Co., of Pittsburg, expects to have its rolling mill completed and in operation about Jan. 1. It will manufacture black plates for tinning (annual capacity 12,500 gross tons), and tin and terne plates.

A strike of tool makers in the various bicycle factories at Toledo, O., except one, was turned into a lock-out Oct. 18, by the closing down of all the works. Over 4,000 men are idle. The men demand a 10 per cent advance.

The Penn Steel Casting Co., Chester, Pa., has received a contract from the Baldwin Locomotive Works for 280 driving wheel centers of 3,000 pounds each, with necessary cross heads, driving boxes and other castings.

In his circular to shareholders of the Pennsylvania and Maryland steel companies, President Effingham B. Morris says: "The business is at present in a profitable condition, and the outlook is in all respects satisfactory."

In the rebuilding of the Andrews Bros.' Co.'s furnace at Haselton, O., early next year, its annual capacity will be increased from 72,000 gross tons to 100,000 tons and another Cowper-Kennedy stove and two blowing engines will be added.

The Ohio Mining & Mfg. Co., of New York, has leased its two furnaces at Shawnee, Perry Co., O., to the Ohio Iron Co., of Zanesville, O. The furnaces will produce foundry and forge pig iron; total annual capacity, 45,000 gross tons.

The court has granted A. S. Patterson, receiver of the Mahoning Rolling Mill Co., of Danville, Pa., an order to sell the rolling mill, machine shops, foundries, railroads, machinery, also the interest of the company in the Enterprise Foundry & Machine Works.

The Southwark Foundry & Machine Co., of Philadelphia, has a contract to furnish a blowing engine for the new Bessemer plant of Jones & Laughlins. It will be of double compound condensing, quarter-crank type and will have a 48-inch stroke and 54x48 air tubes.

The new Struthers blast furnace, at Struthers, O., which will be operated by Brown, Bonnell & Co. until May 1, when it is handed over to the new owners, Runyon, Stubbs & Co., of Cleveland, went in blast Oct. 17. The present capacity is 150 tons a day. When the new stoves are finished 250 tons a day can be reached.

At Cincinnati preparations for the casting of a mammoth church bell have been going on for some weeks at the Buckeye Bell Foundry. It will be larger than the famous 13½ ton bell at Montreal, which is now the greatest bell on the continent. It will supplement a chime of forty bells in St. Francis de Sales Church.

The rod mill at the New Castle Wire Nail Co.'s mills, on a ten-hour turn on a recent night made the largest run ever made on a two-furnace mill, turning out 31,700 pounds of rods. A broken box on the finishing train caused a delay, equivalent to 9,000 pounds. The run is 7,000 pounds more than ever was made by this mill.

The Sunbury Iron Works, at Sunbury, Pa., idle for several years, were recently sold and will soon resume. The works are equipped with several puddling furnaces, two trains of rolls, and 41 cut-nail machines, and have an annual capacity of 120,000 kegs of cut-nails. James May is president; James B. McCamant, treasurer, and N. R. Turner, secretary.

The casualty insurance of the Beaver Tin Plate Co., Lisbon, O., has been placed with the Guarantors, of Philadelphia. The policies cover the liability and boiler insurance. Owing to the increase of business and the importance of the Cleveland district, the Guarantors have lately appointed Geo. G. Brown as district manager, with headquarters at 201 Cuyahoga Bldg. The company has been quite successful in getting business among iron and steel manufacturers of the Central West.

The plant formerly operated by the Brilliant Iron & Steel Co., at Brilliant, O., and which is being rebuilt for the manufacture of pipes and tubes, will commence operations in the puddling and muck mills this week. Additional mills for the rolling of various sizes of grooved and sheared skelp are being put in. Contracts will soon be let for the erection of lap and butt weld furnaces, pipe rolls, threading and testing floors and other necessary equipment. Joseph R. Jackson, formerly of McKeesport, Pa., is identified with the new concern.

The oilless bearings manufactured by the North American Metaline Co., Long Island City, N. Y., do away with the use of oil on loose pulleys. A prominent manufacturing concern of Newark, N. J., writing under recent date to the manufacturers, says: "Gentlemen:—Please ship to our address bushings for loose pulley, dimensions. . . . We have had some of these bushes running about 8 years at 380 revolutions per minute, but this one machine drives with a cross belt and wears lopsided in about four or five years, which seems long enough at best, without oil or other lubricant. We are well satisfied even at one year, so hurry this set along and oblige."

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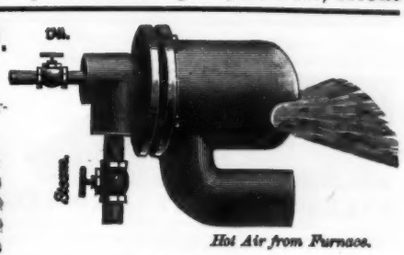

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ONE MAN CAN HAUL A TON.

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Ten Sizes with CAPACITIES from FIVE to THIRTY BUSHELS.

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Akron Tubular Steel Wheelbarrows.

THE AKRON CULTIVATOR CO., Manufacturers,
AKRON, O.

and 25 box cars for the Duluth & Iron Range Railroad. Six engines for the Ohio River Road. The Portland & Rochester will buy 20 cars. The Boston & Maine is figuring on 1,000 cars. N. Y., L. E. & W. has placed a 1,000 car order with the Michigan Peninsular Car Co. New York, New Haven & Hartford has just given out orders for 1,600 cars, divided among the Wason Mfg. Co., the Keith Mfg. Co., and the Osgood Bradley works. The St. Charles Car Co. has a contract to build 150 freight cars for the National Tehuantepec road. The New York, Ontario & Western has just awarded a contract for 250 coal cars.

The Morton Tin Plate Co., of Cambridge, O., reports a steady increase in the demand for higher grades of plates, and is confining its operations strictly to the manufacture of these goods, so far as its tinning department is concerned. After looking around for specialties, owing to its inability to secure remunerative prices for black plates, the company has placed upon the market smooth rolled sheets for making stove pipe. The general practice for years past has been to supply these sheets in long lengths, principally 24″ wide by 101″ long. The Morton Co. cuts the sheets to exact sizes and puts them up in boxes, as with tin plate.

In drilling a gas well on its mill property, the Atlanta Steel & Tin Plate Co., Atlanta, Ind., at a depth of 520 feet, struck a vein of pure artesian water, that appears inexhaustible. The water is entirely free from all injurious substances and will prove an excellent source of supply for drinking purposes. The company, after striking water and piping it off, continued the well down to the Trenton rock, and now enjoys the unique privilege of drawing its entire supply of water and almost all its gas supply from the same well in the mill yard. The company's gas line will be utilized to some extent the coming winter for supplying gas to a part of the citizens of Atlanta.

At the annual meeting of the Pullman Palace Car Co., at Chicago, Oct. 17, the president's report for the fiscal year ending July 31, 1895, showed total revenues of $8,547,500, and total disbursements, including $2,880,000 in dividends (four quarterly dividends of 2 per cent each on $36,000,000), of $7,137,243. Surplus for the year $1,410,390. The value of the manufactured product of the car works of the company for the year was $4,419,555, and of other industries, including rentals, $566,573, making a total of $4,986,128, against $4,925,331 for the previous year. The apparent increase in the value of the plant at Pullman was occasioned by taking in Union Foundry and Pullman Car Wheel works plant as a part of the Pullman Car works. Mr. Pullman expressed regret that the demand for cars throughout the country has not been equal to the existing facilities for supplying it, and the competition naturally resulting from this condition had compelled the company to take contracts, as in the previous year, absolutely without profit

The Cleveland Twist Drill Co., Cleveland, makes the following announcement under date of Oct. 18: "We take pleasure in announcing to our customers and the trade in general that letters patent have been issued to us on our grip socket, under date of Oct. 15, 1895. We have defended our right to the patent against the most persistent efforts of another party, who set up an interference, claiming priority of invention, and threatening our customers and ourselves with infringement suits. We have received judgments in our favor in every court of appeal, and the final issuing of the patent to us settles the question of our right to manufacture and sell these grip sockets without let or hindrance, and we stand ready, regardless of expense, to defend our rights to the fullest extent of the law."

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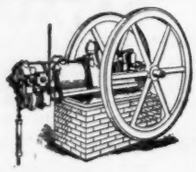

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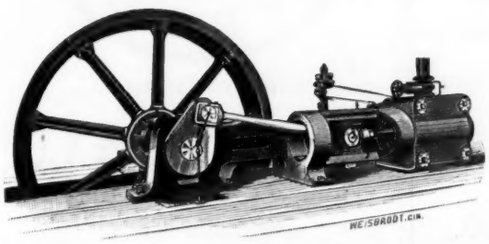

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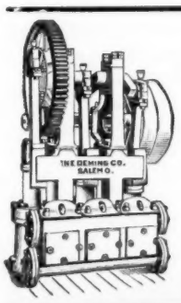

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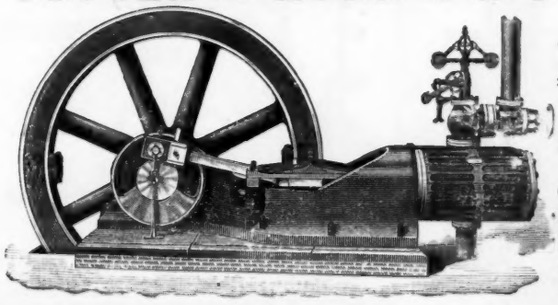

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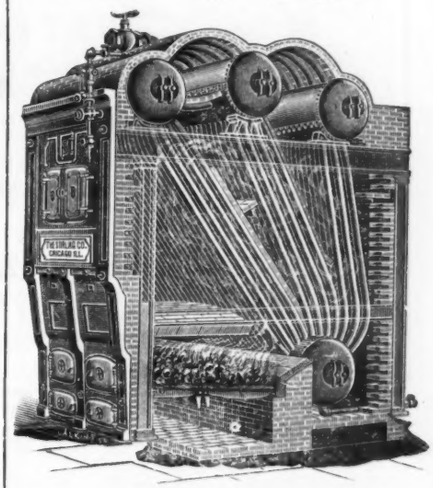

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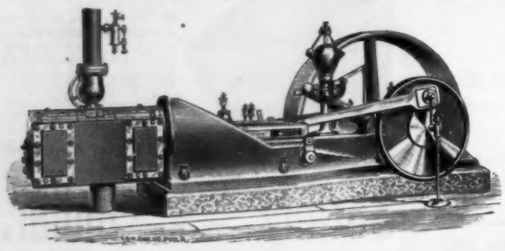

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Simple, Compound, Triple, Close Regulation, High Economy.

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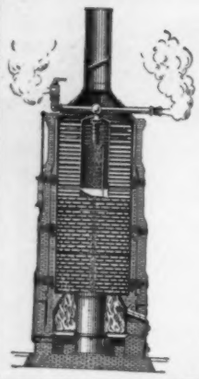

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UNEQUALED FOR UTILIZING THE WASTE-HEAT OF ROLLING MILL FURNACES.

Absolutely Safe. Highest Efficiency. Superior Workmanship.

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SOLE PROPRIETORS AND MANUFACTURERS,

Telephone 1229, 18th St., N. Y. Cable address: "Paila," New York,

GENERAL OFFICE: 716 EAST 13th St., NEW YORK, U. S. A.

E. S. T. Kennedy, President. W. T. Kennedy, Vice President. J. B. Reeve, Secretary

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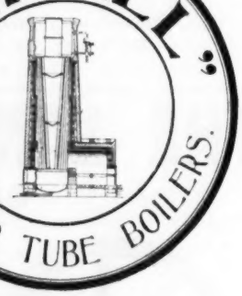

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Being in the boiler business

For a long time,

We have learned that **HEATING SURFACE** does not always mean **HORSE POWER;**

It depends upon getting the HEAT to the SURFACE.

We have also learned that the only way to make a HIGH GRADE article, and sell it for about the same price as an ordinary one, is to concentrate our WHOLE PLANT and ENERGIES upon ONE ARTICLE—

THE TUBULAR STEAM BOILER.

Write us for Prices and Specifications. You need not unload the goods off the car if not as represented.

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SHARPLESS & WINCHELL,

809 and 811 Wright Block, MINNEAPOLIS, MINN.
Analytical Chemists and Assayers.
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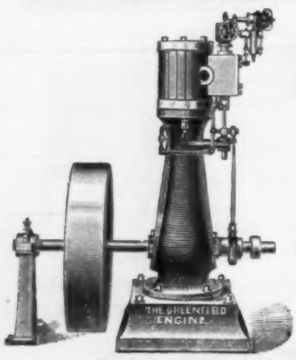
Mines examined. Advice given on treatment of ores and development of properties.
Intimate acquaintance with Lake Superior Mineral Regions.



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Established 1874.

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"Greenfield" Stationary, Portable and Yacht **ENGINES AND BOILERS.**

Also Horizontal, Automatic and Variable Cut-off Engines

Sizes from 3 to 75 Horse-Power.

Also Vertical and Horizontal and Marine Boilers. Steam Pumps and Adams' Grate Bars.

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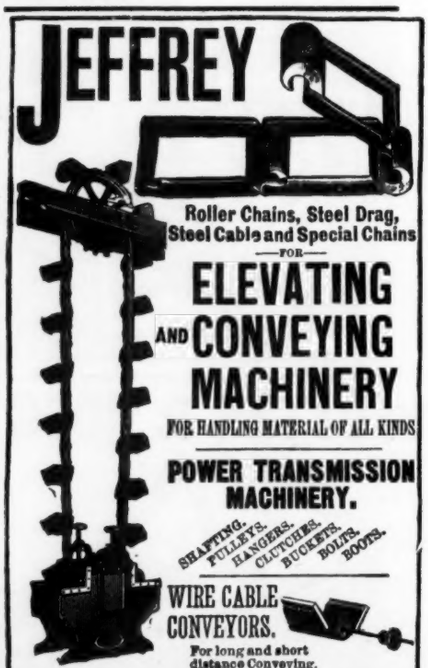

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ELEVATING AND CONVEYING MACHINERY

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For long and short distance Conveying.

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Standard Tubular, Fire Box, Vertical and Submerged Tube Steel

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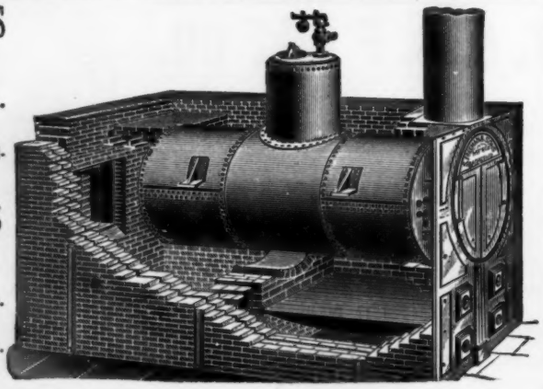
For Stationary, Portable, or Marine use.

Also of **TANKS** of all kinds. Smokestacks, etc., Grey Iron Castings.

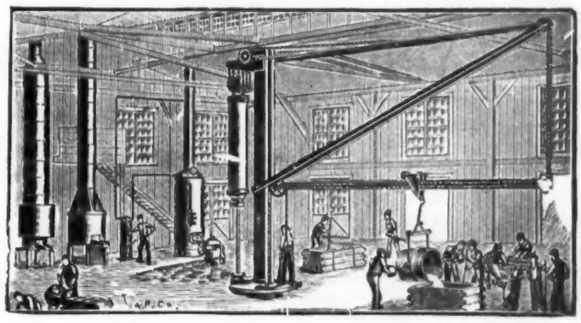
Write for Prices and Terms.



Fire the Gentleman! Fire Him!

The very idea of a superintendent advising you to put in a winding crane now-adays! Why, he is not up in his business, that man isn't, and you want men about you who keep up with the procession, or the first thing you know your concern will be dying of dry rot. You don't want to put money into a machine that takes 15 minutes to handle a load when you can get a better machine for the same money that will do it in 15 seconds, and make no fuss about it either.

THE RIDGWAY STEAM-HYDRAULIC CRANE



-ton Steam-Hydraulic Crane in a Foundry.

Is what we are referring to. It is not any new-fangled concern that nobody knows much about Everybody who reads the papers or travels around knows about it. We are putting them in the best concerns everywhere, and you just ought to hear what they say about them. Here's four for a sample. Can't give the names here because such prominent concerns might object to their names used in the patent medicine way, but if you write us you'll find out:

CRAIG RIDGWAY & SON:

DEAR SIRS:—We have your favor asking if we had any objection to your using the letter you have from us praising your Crane in your newspaper ads. I sent your letter in to our President, Mr. ———, and he wrote across it: **"We can not indorse the Ridgway Crane too highly. We will take out all our other Cranes and put in the Ridgway."** I merely tell you this to let you know how thoroughly well pleased we are with your cranes.

Signed by one of the largest and best equipped foundries in the West, employing over 1,000 men.

CRAIG RIDGWAY & SON:

DEAR SIRS:—It gives me pleasure to state that the Ridgway cranes which we have in operation at our works have given us entire satisfaction. **Where medium and light weights** (under 25 tons) **have to be handled I do not know of any type of Crane that equals them.**

Signed by one of the largest Steel Works in this country, employing about 5,000 men.

CRAIG RIDGWAY & SON:

DEAR SIRS:—Answering yours in regard to cranes purchased from you will say, **I fully agree with you in saying they are the Best Foundry Cranes on Earth to-day. There is not one objectionable feature in them.** We have them in constant use. Our molders' helpers operate them with perfect satisfaction.

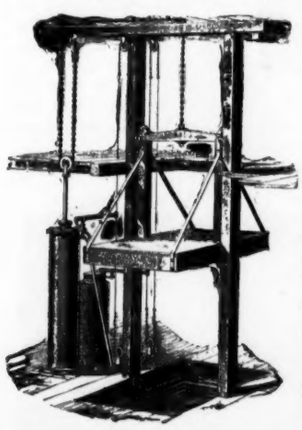
Signed by the largest concern in the Northwest, employing 2,000 men.

CRAIG RIDGWAY & SON:

DEAR SIRS:—I would say we are well pleased with the service of your Steam-Hydraulic Crane. As you know, we have 8 of them in our works, four of which are in hourly service day and night handling plate iron, and operated by unskilled labor. The service is constant and severe and yet the repairs to your cranes during the three or four years we have had them has been very little.

Signed by the largest manufacturing concern in this line in the world, employing 4,000 men. They have, since writing this, put in more of them.

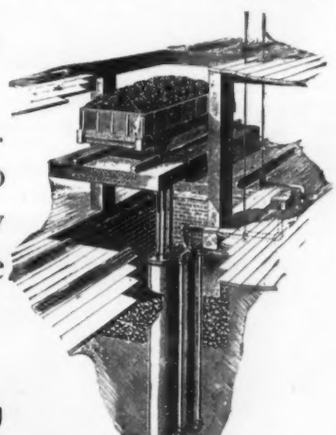
And the fun of it is, we have just dead loads of such letters to show you, if you will take the trouble to write us.



Steam Hydraulic Elevator, also made direct acting with cylinder under platform.

"Please take the Elevator."

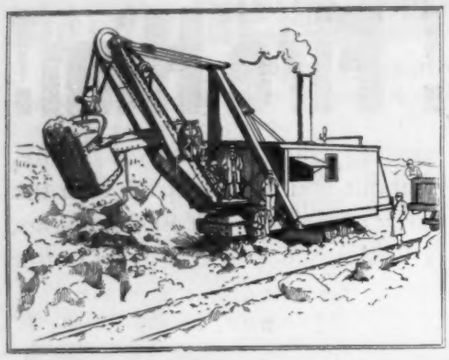
Either of them. It don't matter. Depends how high up you want to go. Greatest machine you ever saw for "histin'" things. We are placing lots of them.



Direct Acting Steam-Hydraulic Elevator.

Craig Ridgway & Son,

COATESVILLE, PA.



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STEAM SHOVELS	Five sizes for every purpose. Standard Railroad Shovels. Special Shovels to order.
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GOLD SAVING MACHINERY	For Placer Mining. With steam shovels and appliances for disposal of tailings.
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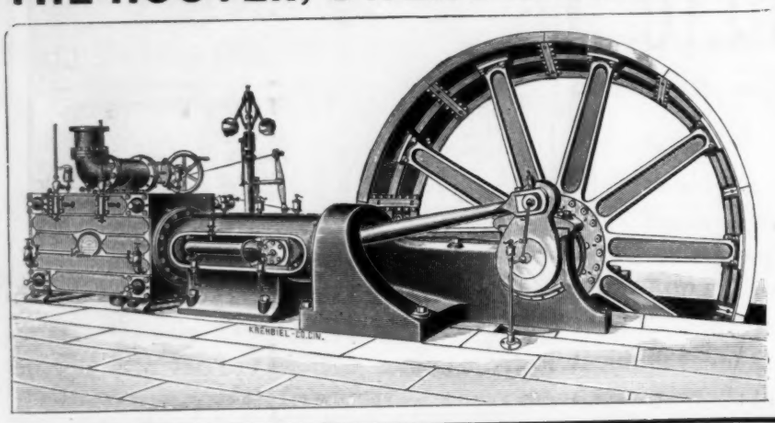

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Engines of all Sizes and for all purposes.

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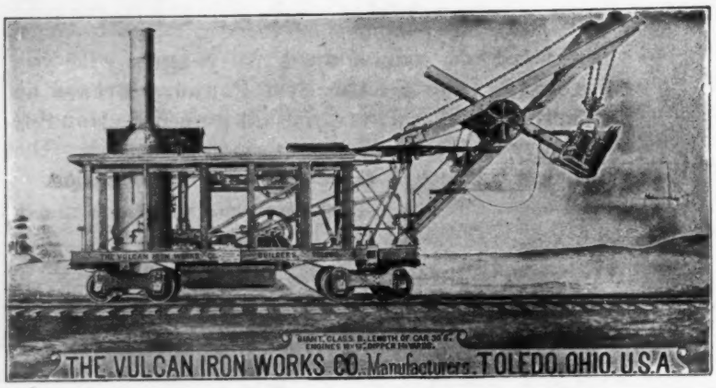

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VULCAN IRON WORKS CO.,

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There is no Steam Shovel on the market so well adapted to handling Iron Ore as our "Giant." We guarantee 2,500 tons in ten hours.

Our "Giant" has the record on the Mesabi Range.

LOOK AT THIS!

Sample piece of FLUE taken from Locomotive No. 725 running for 7 months on Western Division of N. Y. C. & H. R. R. R. showing amount of SCALE adhering in that time.

If you desire further information, send for our circular, which goes into the subject with cogent reasoning, as well as scientifically, corroborated by testimonials, any of which would convince a practical mechanic, but as "seeing is believing," send in your orders and save time, trouble and money by commencing the use of this known valuable **COMPOUND** at once. Canned in five-pound tins and packed in 100-pound cases, for Land Boilers, price $20 per case. Canned in one-pound tins and packed in 50-pound cases, for Locomotive Boilers, price $25 per case.

Delivered free to any Railroad Station in the United States. Should we not be represented in your town, and should you be well up in the machinery line, we are looking for agents.

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The only Cupola Block which gives absolute satisfaction. It is practically indestructible. We have a testimonial from the inventor of the *Colliau Cupola*, recommending it as "the best."

We have them in stock, made to fit any shell. The use of this block means a close, compact wall with few joints, and a great saving in both labor and material. Standard size fire brick from same clay.

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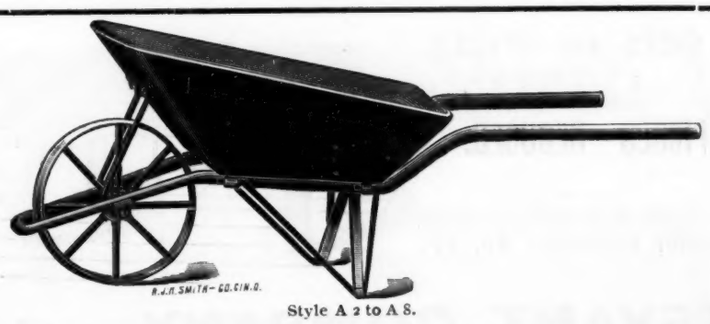

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The name of the Chicago, Milwaukee & St. Paul Railway has long been indentified with practical measures for the general upbuilding of its territory and the promotion of its commerce, hence manufacturers have an assurance that they will find themselves at home on the company's lines.

The Chicago, Milwaukee & St. Paul Railway Company owns and operates 6,154 miles (9,900 kilometers) of railway, exclusive of second track, connecting track or sidings. The eight States traversed by the lines of the company, Illinois, Wisconsin, Northern Michigan, Iowa, Missouri, Minnesota, South Dakota, and North Dakota, possess, in addition to the advantages of raw material and proximity to markets, that which is the prime factor in the industrial success of a territory—a people who form one live and thriving community of business men, in whose midst it is safe and profitable to settle. Many towns on the line are prepared to treat very favorably with manufacturers who would locate in their vicinity.

Mines of coal, iron, copper, lead and zinc, forests of soft and hard wood, quarries, clays of all kinds, tan-bark, flax and other raw materials exist in its territory in addition to the vast agricultural resources.

A number of new factories have been induced to locate—largely through the instrumentality of this company—at towns on its lines. The central position of the States traversed by the Chicago, Milwaukee & St. Paul Railway, makes it possible to command all the markets of the United States. The trend of manufacturing is Westward. Nothing should delay enterprising manufacturers from investigating. Confidential inquiries are treated as such. The information furnished a particular industry is reliable.

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Note the advantages of the **only Power Molding Machine adapted to different sizes and shapes of flasks.**

Our 16″ Duplex will mold, working Duplex, both parts of flask 12″x16″ and all sizes below; this same machine, when working Single will mold flask 16″x20″ and all sizes under.

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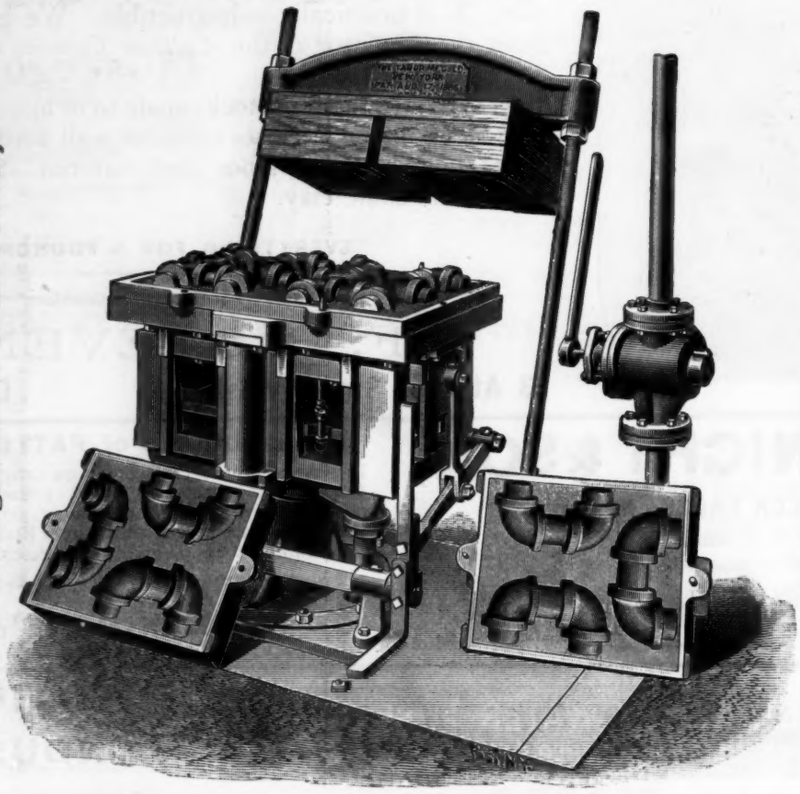
This feature allows a range of work, by one of our Machines, which would require a number of any other type. This is of the greatest importance to Foundries.

The Milling Machine of the Foundry.



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These machines are adapted to general castings when made in reasonable quantities.

The use of these machines is a guarantee of economy, greater quantity and better quality in castings.

Foundrymen who are interested in producing cheap castings of superior quality are invited to correspond with the Company and call at the works, Front and Franklin Streets, Elizabeth, N. J., and see the machines in operation.

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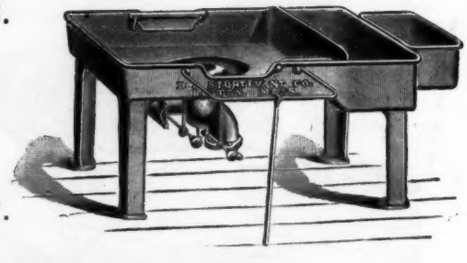
STURTEVANT FORGES

40 SIZES and STYLES.

PRICES REDUCED.



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135 North Third St., Philadelphia, Pa.

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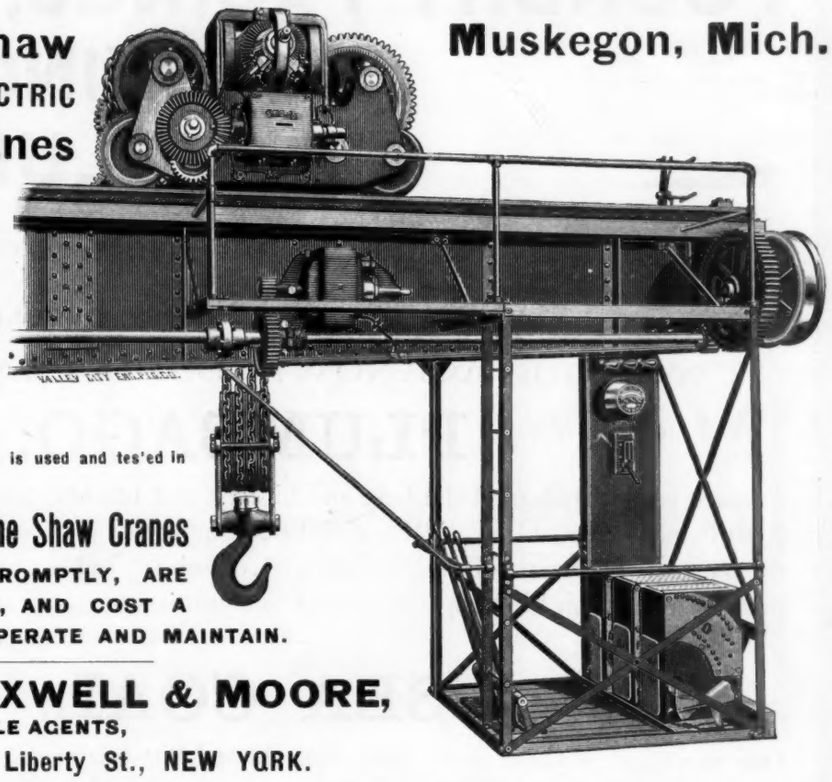
BUILDERS OF THE

Celebrated Shaw

THREE MOTOR ELECTRIC

Traveling Cranes

Muskegon, Mich.



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IT IS A FACT,

In every instance where the

SHAW CRANE is used and tes'ed in comparison with other makes

It is Demonstrated that the Shaw Cranes

DO THE WORK MORE PROMPTLY, ARE MORE EASILY HANDLED, AND COST A GREAT DEAL LESS TO OPERATE AND MAINTAIN.

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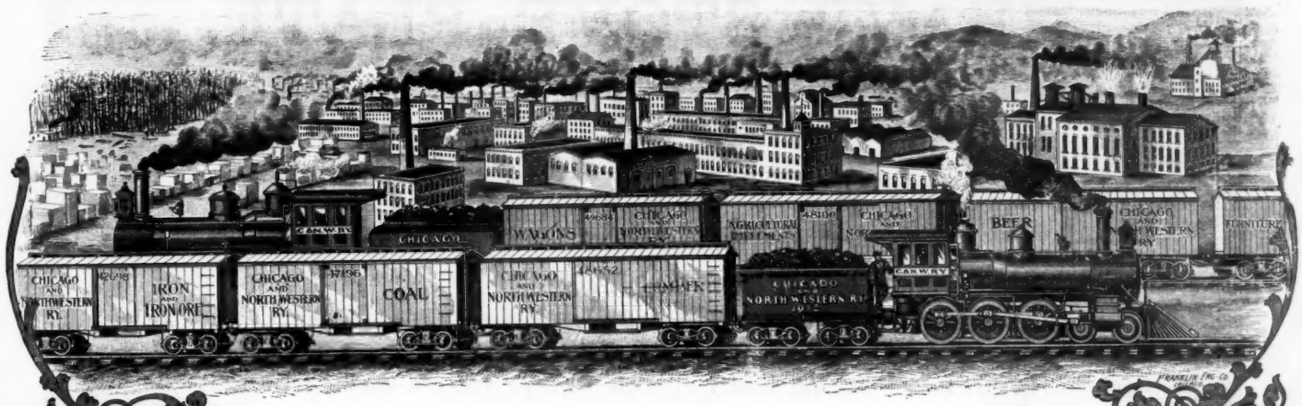

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Stove Founders should give our heavy Stove Plate Facing a trial. We believe it to be the best Facing for stove and hollow ware purposes made.

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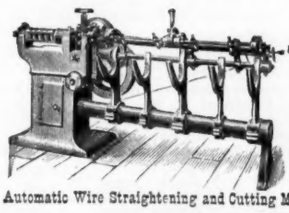

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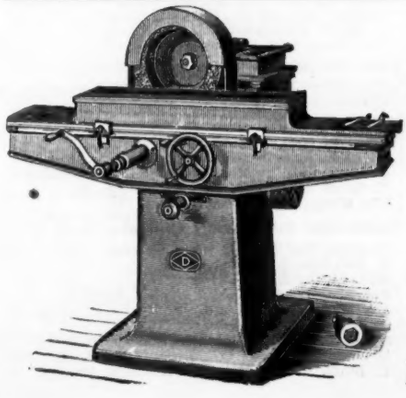

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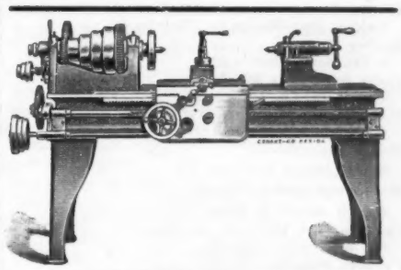

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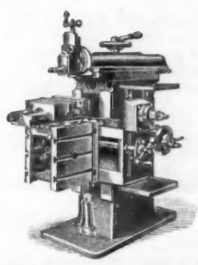

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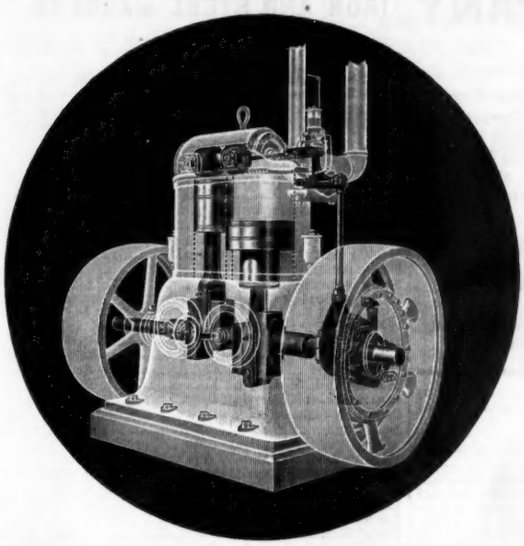

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J. H. Fleharty & Co., Cleveland.

Steel Tanks—
Wm. B. Scaife & Sons, Pittsburg, Pa.

Turnbuckles—
Cleveland City Forge & Iron Co., Cleveland.
Central Iron & Steel Co., Brazil, Ind.

Tanks—
S. Freeman & Sons Mfg. Co., Racine, Wis.
Enterprise Boiler Co., Youngstown, O.
Wm. B. Scaife & Sons, Pittsburg, Pa.

Telephones—
Union Electric Co., Cleveland, O.
Universal Telephone Co., Indianapolis, Ind.

Tinning Machinery—
The Lloyd-Booth Co., Youngstown, O.

Tin Plate—
Gummey, McFarland & Co., Philadelphia, Pa.
Morton Tin Plate Co., Cambridge, O.

Torches—
Dangler Stove & Mfg. Co., Cleveland, O.

Tool Steel—
Wm. Jessop & Sons, Ltd., New York, N. Y.
C. H. Besly & Co., Chicago, Ill.

Tube Welding—
S. Fix Sons, Cleveland.

Twist Drills—
Cleveland Twist Drill Co., Cleveland.
C. H. Besly & Co., Chicago, Ill.

Valves—
Ed. Wertheim, Chicago.
C. H. Besly & Co., Chicago, Ill.

Ventilating Fans—
Huyett & Smith Mfg. Co., Detroit, Mich.

Wheelbarrows—
Akron Cultivator Co., Akron, O.
Lansing Wheelbarrow Co., Lansing, Mich.

Wire Nails—
Salem Wire Nail Co., Salem, O.

Wire Rope—
W. A. Crook & Bro's Co., Newark, N. J.
American Hoist & Derrick Co., St. Paul, Minn

Wire Machinery—
Cady Mfg. Co., Cleveland, O.
John Adt & Son, New Haven Conn.

THE EDWARD P. ALLIS COMPANY

MILWAUKEE, WIS.

MANUFACTURERS OF

Blowing Engines, Hoisting Engines, Pumping Engines, Air Compressors, Special Engines for Electric Lighting, Street Railways and Rolling Mills, Ore Crushers, Crushing Rolls, Stamp Mills, Concentrators, General Mining, Milling and Smelting Machinery.

Reynolds Patent Vertical Boilers.

Reynolds Corliss Engines.

NEW YORK, Room 1111 Havemeyer Bldg.
CHICAGO, Room 509, Home Ins Bldg
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DENVER, 1316 18th Street.
SAN FRANCISCO, 31 Main Street.
PITTSBURG, 702 German National Bank Bldg.
SALT LAKE CITY, Desert Bank Bldg.
KANSAS CITY, Armour Bldg.

Alphabetical List of Advertisers.

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is an increasingly valuable medium through which to sell equipment to machine shops and foundries.

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The Industrial Centre of Chicago

offers Free Factory Sites and other inducements.

If you are seeking a new location it will pay you well to investigate the merits of our proposition

Chicago Heights Land Association

M. H. KILGALLEN, Gen'l Mgr. CHICAGO

IRON AND STEEL MARKETS.

IRON ORE.

[On Lake Erie docks.]

No. 1 Specular, Bessemer	$4.75@ 5.25
No. 1 Bessemer hematite	4.25@ 4.50
Hematites No. 1 non-Bessemer	2.50@ 3.00
No 1. Specular, non-Bessemer	3.00@ 3.50

PIG IRON.

CLEVELAND (f. o. b. cars):

Bessemer	$16 00@ 16 25
No. 1 Strong Foundry	15 50@ 15 75
No. 2 Strong Foundry	14 75@ 15 25
No. 1 Gray Forge, red short	13 75@ 14 00
No. 2 Gray Forge, neutral	13 00@ 13 25
No. 1 American Scotch	15 75
No. 2 American Scotch	@ 15 25
Lake Superior Charcoal	15 50@ 16 00

PITTSBURG:

No. 1 Foundry	$15 00@ 15 50
No. 2 Foundry	14 00@ 14 50
Gray Forge	13 00@ 13 50
White and Mottled	12 50@ 12 75
Warm Blast Charcoal	16 00@ 17 00
Cold Blast Charcoal	22 00@ 26 00
Bessemer	16 00@ 16 25

CHICAGO (reported by our representative:)

Lake Superior Charcoal	$15 50@$16 00
Local Coke Foundry No. 1	15 00@ 15 50
Local Coke Foundry No. 2	14 50@ 15 00
Local Coke Foundry No. 3	14 0 @ 14 50
Local Scotch Foundry No. 1	15 00@ 15 50
Local Scotch Foundry No. 2	14 50@ 15 00
Local Scotch Foundry No. 3	14 0 @ 14 50
Southern Coke No. 1	10 70@ 11 00
Southern Coke No. 2	14 00 .....
Southern Coke No. 3	13 65 .....
Southern No. 1 Soft	14 15 .....
Southern No. 2 Soft	13 90 .....
Southern Silveries No. 1	15 25@ 15 75
Southern Silveries No. 2	15 15 .....
Jackson Co Silveries	15 50@ 16 00
Ohio Silveries No. 1	15 00@ 15 50
Ohio Silveries No. 2	14 50@ 15 00
Ohio Strong Softeners	15 0 @ 15 50
Alabama Car Wheel	17 00@ 17 50
Malleable Bessemer	.....
Coke Bessemer	.....

CINCINNATI (reported by Rogers, Brown & Co.)

Southern Coke No. 1, Foundry	$13 00@$ .....
Southern Coke No. 2 and No. 1 Soft	12 75@ 13 00
Hanging Rock Coke, No 1	12 50@ 13 50
Hanging Rock Charcoal No. 1, Fdy	16 00@ 17 00
Tennessee Charcoal No 1	14 00@ 14 50
Jackson County Silvery No 1	14 00@ 15 00
Southern Coke, Gray Forge	12 50
" " Mottled	12 25@ 12 50
Standard Alabama Car Wheel	15 75@ 16 25
Tennessee " "	14 50@ 15 00
Lake Superior " "	15 50@ 16 50

BUFFALO (reported by Rogers, Brown & Co.)

No. 1 Foundry Strong Coke Iron Lake Superior Ore	$15 25@$15 75
No. 2 Foundry Strong Coke Iron Lake Superior Ore	14 75@ 15 25
Ohio Strong Softener No. 1	16 25@ 16 75
Jackson Co. Silvery No. 1	16 25@ 17 00
Lake Superior Charcoal	16 00@ 16 50
Southern Soft No. 1	15 15@ 15 65
Hanging Rock Charcoal	18 50

ST. LOUIS (reported by Rogers, Brown & Cheam):

Southern Coke No 1	$13 50@$13 75
Southern Coke No. 2	13 25@ 13 50
Southern Coke No. 3	13 00@ 13 25
Southern Gray Forge	13 00@ 13 25
Southern Charcoal No. 1	14 50@ 15 00
Missouri Charcoal No. 1	14 00@ 15 00
Ohio Softeners	16 00@ 17 00
Lake Superior Car Wheel	17 00@ 17 50
Southern Car Wheel	16 50@ 17 00

OLD RAILS AND SCRAP METAL.

	GROSS TONS
Old iron rails	$16 50
Old steel rails	13 50
Old Car Wheels	11 50
	NET TONS
No. 1 R. R. wrought scrap	$14 00
Mill scrap	11 00
No. 1 Machine cast scrap	10 00
Iron axles	20 00
Axle turnings	9 50
Wrought turnings (free from cast)	8 50
Cast borings	7 50
Uncut wrought iron boilers	6 00
Steel boiler plates	11 50
Grate bars	6 50
Pipes and flues (clean)	9 50
Tank iron	9 50
Hoop and band iron	7 00
Sheet iron	7 00
Wrought drillings	8 00
Malleable iron	7 00

STRUCTURAL MATERIAL.

Beams and Channels (Cleveland mill)	1.75c@1.85c
Angles	1.65@1.70c
Tees	1.80c@1.90c
Universal Plates	1.90c
Sheared Plates	2.00c

MERCHANT IRON AND STEEL.

[List prices out of store.]

Flat Bar.

1½ to 4 by ⅜ to 1 inch	1 60
1¼ to 6 by ⅜ to 1 inch	1 65
1¾ to 6 by 1½ to 2 inch	1 80
1¼ & 1⅜ by ⅜ to ¾ inch	1 65
1 & 1½ by ⅜ to ¾ inch	1 70
⅛, ¼, ⅜, by ¼ to ½ inch	1 80

Frank P. Cady, Pres. and Supt.
Geo. H. Bowler, Sec'y and Treas.

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18, 20 and 22 Johnson St., CLEVELAND, O.

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OF ALL KINDS FOR

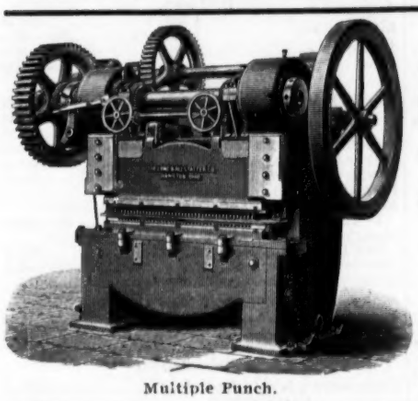
MILLING MINING AND AGRICULTURAL MACHINERY,

PERFORATED IRON, STEEL, COPPER, BRASS, TIN, ZINC, LEAD, ETC., TO ORDER.

LARGE AND VARIED ASSORTMENT OF SIZES. CORRESPONDENCE SOLICITED.

THE ROBERT AITCHISON. PERFORATED METAL CO.,

OFFICE, ROOM 510 265 TO 269 DEARBORN STREET, CHICAGO, ILL. WORKS SOUTH CHICAGO.



Multiple Punch.

—THE—

Long & Allstatter Co.

HAMILTON, O., U. S. A.

Manufacturers of Belt, Steam and Electrically driven

Power Punches and Shears

for all kinds of Boiler, Tank and Structural Iron Work, Rolling Mills, Locomotive Shops, Car and Wagon Shops, Plow Shops, etc. Send for catalogue.

A. H. LEITCH, PREST. JOHN C. LEITCH, SEC. AND TREAS.

WESTMORELAND FIRE BRICK CO. MANUFACTURERS OF HIGH GRADE FIRE BRICKS.

PITTSBURG, PA.

Works and Mines, Westmoreland, Pa.

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Pays special attention to iron ore, blast furnace, rolling mill, foundry and machine shop interests. Per year **$3.00.**

IRON CLAD PAINT CO.

Factory, 75 & 77 Central Way. Sec. & Treas., No. 3 Case Build'g.

CLEVELAND, OHIO.

Trade Mark Patented.

ORDER DIRECT FROM THE

Iron Clad Paint Co.

And get the genuine article, and save liability of suit for using an article made in violation of the patents issued to Wm. Green, and now owned by this Company.

IRON CLAD PAINT is the most durable, most fire-proof and Cheapest Paint made.

FURNISHED both Dry and Ground in Oil

USED BY NEARLY ALL THE RAILROADS.

Round and Square.

1 to 1⅞ inch	1 60
2 to 2⅜ inch	1 80
2⅜ to 3¼ inch	1 75
3⅜ to 4 inch	2 10
4⅛ to 4⅜ inch	2 70
4¾ to 5 inch	2 90

Oval.

⅜ to 1¼ inch	1 80
⅝ to ¾ inch	1 80
⅛	2 00
⅜	2 20

Half Oval and Half Round.

1¼ to 3 inch	2 15
⅜ to 1¼ inch	1 95
⅝ to ¾ inch	2 20
⅛	2 38
⅜	3 45

Heavy Band.

1¼ to 6 by ¼ and 5-16 inch	1 70
1 to 1¾ by ⅜ and 5-16 inch	1 75
¾ to ⅞ by ⅜ and 5-16 inch	1 85
½ to ⅝ by ¼ and 5-16 inch	2 10

Hoop Iron.

1 7-16 to 4, No. 13, 14, 15 and 16	2 15
1 7-16 to 2, No. 17, 18 and 19	2 20
1 7-16 to 2, No. 20	2 30
1 7-16 to 2, No. 21	2 40
1 7-16 to 2, No. 22	2 50
1⅛ to 1¾, No. 13, 14 and 15	2 20
1⅛ to 1⅜, No. 16, 17 and 18	2 25
1⅛ to 1⅜, No 19 and 20	2 30
1⅛ to 1⅜, No. 21	2 40
1⅛ to 1⅜, No. 22	2 50
15-16 and 1 inch, No. 13, 14 and 15	2 15
15-16 and 1 inch, No. 16, 17 and 18	2 30
15-16 and 1 inch, No. 19 and 20	2 40
15-16 and 1 inch, No. 21	2 50
15-16 and 1 inch, No. 22	2 60
⅞, No. 13, 14 and 15	2 40
⅞, No. 16. 17 and 18	2 0
⅞, No. 19 and 20	2 60
⅞, No. 21	2 70
⅞, No. 22	2 80
13-16, No. 13, 14 and 15	2 50
13-16, No. 16, 17 and 18	2 60
13-16, No. 19 and 20	2 70
13-16, No. 21	2 80
13-16, No. 22	2 90
¾, No. 13, 14 and 15	2 60
¾, No. 16, 17 and 18	2 75
¾, No. 19 and 20	2 88
¾, No. 21	2 95
¾, No. 22	3 05
11-16, No. 13, 14 and 15	2 85
11-16, No. 16, 17 and 18	2 90
11-16, No. 19 and 20	3 00
1-16, No. 21	3 10
11-16, No. 22	3 20
11-16, No. 23	3 30
⅝, No. 13, and 15	2 90
⅝, No. 16, 17 and 18	3 00
⅝, No. 19 and 20	3 10
⅝, No. 21	3 20
⅝, No. 22	3 30
⅝, No. 23	3 40
9-16, No. 13, 14 and 15	3 10
9-16, No. 16, 17 and 18	3 20
9-16, No. and 20	3 30
9-16, No. 21	3 40
9-16, No. 22	3 50
9-16, No. 23	3 60
7-16 and ½ inch, No. 13, 14 and 15	3 30
7-16 and ½ inch, No. 16, 17 and 18	3 40
7-16 and ½ inch, No. 19 and 20	3 50
7-16 and ½ inch, No. 21	3 60
7-16 and ½ inch, No. 22	3 70
7-16 and ½ inch, No. 23	3 80
⅜, No. 13, 14 and 15	3 80
⅜, No. 16, 17 and 18	3 90
⅜, No. 19 and 20	4 00
⅜, No. 21	5 31
⅜, No. 22	4 40
⅜, No. 23	4 55

Light Band.

1½ to 6 by ⅛ to 3-16 inch	1 90
1¼ to 6 by Nos. 11 and 13	1 95
1 to 1¾ by ⅛ to 3-16 inch	1 95
1 to 1¾ by Nos. 11 and 12	2 00
⅞ and 13-16 by ⅛ to 3-16 inch	2 10
⅞ and 13-16 by Nos. 11 and 12	2 15
¾ and 11-16 by ⅛ to 3-16 inch	2 20
¾ and 11-16 by Nos. 11 and 12	2 25
⅝ and 9-16 by ⅛ to 3-16 inch	2 35
⅝ and 9-16 by Nos. 11 and 12	2 40
½ by ⅛ to 3-16 inch	2 50
½ by Nos. 11 and 12	2 55

Wagon Box Iron.

⅞ inch, beveled edge, by Nos. 11 and 12	2 10
⅞ inch, " " " 13 and 14	2 20
¾ inch, " " " 11 and 12	2 25
¾ inch, " " " 13 and 14	1 55

Sheet Iron.

No. 10	3 10
No. 12	2 20
No. 14	2 25
No. 15-17	2 35
No. 18	2 50
No. 20	2 65
No. 22-24	2 75
No. 25 26	2 85
No 27	2 95

Steel Boiler Plates—1-4 in. and Heavier.

Tank	2 00
Shell	2 15
Flange	2 75
Marine Flange	2 60
Fire Box	3 70

Above includes plates 90 inches wide.

90 to 96 in. wide	½c. lb. extra
96 to 100 in. wide	1 c. "
100 to 104 in. wide	1½c. "
104 to 106 in. wide	special

American Cast Tool Steel.

ROUND, SQUARE AND OCTAGON.	cts lbs
1 to 2 in. inclusive	08
9-16 to ⅞ in. "	08½

HOISTING MACHINERY

for Mining, Quarrying, Coal Handling, Pile Driving, Bridge Building, Log Hauling, and for general Contractors' Use. Improved Electric Hoists, single and double Patent Friction Drum, compound, geared with brakes and reversible for general Hoisting, Mining Purposes and Suspension Cable Ways.

Send for Illustrated Catalogue giving full description, etc.

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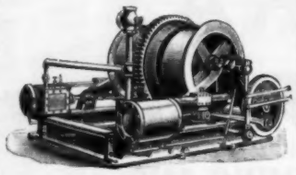

W. A. CROOK & BRO'S CO.

Salesrooms 143 Liberty st., N. Y 117-123 POINIER ST., Newark, N. J.

W. H. COFFMAN COKE CO.

BLUEFIELD, W. VA.

GENERAL FACTORS AND SHIPPERS OF

POCAHONTAS FLAT-TOP COKE.

So low in ash that it requires no fluxing for foundry purposes. Our foundry and furnace coke was awarded the first premium at the World's Fair in 1893.

AVERAGE ANALYSIS OF COKE.

Moisture	00.196	Sulphur	00.677
Fixed Carbon	93.625	Ash	05 004
Volatile Matter	00.494		

Foundry, Furnace and all sizes of crushed coke. Guaranteed lower in Sulphur than any other commercial coke

STEEL CASTINGS

OF EVERY DESCRIPTION

Made from Best Open-Hearth Steel.

SEND FOR ESTIMATES.

THE JOHNSON COMPANY, Johnstown, Pa.

CHICAGO HEIGHTS

The Industrial Centre of Chicago

offers Free Factory Sites and other inducements.

If you are seeking a new location it will pay you well to investigate the merits of our proposition.

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FOR ARTISTIC PRINTING WRITE THE CLEVELAND PRINTING & PUBLISHING CO., CLEVELAND, O.

A growing circulation among machine shop and foundry firms, has THE IRON TRADE REVIEW.

For 22 Long and Successful years we have made our

"O.K." CROWN

OUR PRICES ARE JUST RIGHT

High Grade Fire Brick, in all shapes and sizes. They have stood the TEST with eminent satisfaction to our many customers, because they are made entirely on HONOR.

OAK HILL FIRE BRICK AND COAL CO. Manufacturers

OAK HILL, OHIO

7-16 to ⅜ and 2⅜ to 3 in	.09
3⅜ to 4 in	.09½
⅜ to 11-16 and 4⅛	.10
⅛ to 6 in	.10½
⅝ to 9-32 and 6⅛ to 7 in	.11
7 in	.13

Flats.

	cts. ℔s
2 to 9-16 in. wide by 2 to ⅝ thick	.8

Bessemer and O. H. Steel.

Bessemer Machinery	base price,	1 50
Open-hearth Tire	"	1 80
Open-hearth Spring	"	2 20
Sleigh Shoe	"	1 90
Toe Calk	"	2 10
Cutter Shoes, tapered and bent	"	2 20

English Tool Steel.

Jessop's	15½c
Hobson's "Best"	15½c
" "Choice"	35c

Burden Boiler Rivets.

½, ⅝, 11-16 and ¾ inches diameter	3 30
Bridge ½, ⅝, 11-16 and ¾ inch diam	3 00

Wrought Pipe and Boiler Tubes.

Lap weld black, base	dis. 65
Butt " " "	dis. 55
Lap " galv. "	dis. 52½
Butt " " "	dis. 50
Boiler tubes 2¼" and smaller	dis 62½
Boiler tubes 2½" and larger	dis. 65
Casing screw and socket joint	dis. 52½
Casing inserted joint	dis. 47½

MACHINERY SUPPLY MARKET.

Anvils.

American	℔ 9@10
Wright's	℔ 12

Bellows.

Blacksmiths' Hill's	dis 40
Blacksmiths' Bullock's	dis 50&10
Moulders'	dis 40@40&10
Hand	dis 40&10@50

Belting.

Boston Belting Co.'s standard	dis 70
" " " extra	dis 60&5
" " " best	dis 55
Cleveland Rubber Co. extra standard	dis 60&10
Hoyt's Short Lap	dis 45
Shultz Raw Hide Leather Belting, single,	dis 40
Munson's Short Lap Single Leather	dis 50
Munson's Short Lap Double and Light Double Leather	dis 50&10
Shultz Raw Hide Leather Belting, Double and Light Double	dis 40
Standard, oak tanned	dis 50&10
Alexander Brothers' pure oak tanned	dis

Blowers and Exhausters.

B. F. Sturtevant's	dis 20
Boston Blower Co.,	dis 35
Buffalo	dis 40

Chucks.

Cushman's 4 Jaw Independent	dis 45
" Combination	dis 40
" Geared Scroll	dis 30
" 2 Jaw Brass Workers	dis 30
" Drill	dis 35
Wescott's Scroll Combination	dis 33⅓
" Independent	dis 40
" Little Giant Drill	dis
Horton's Universal	dis
" Independent	dis 45
Whiton's Independent	dis 45
National Combination	dis 40
Sweetland "	dis 40
Almond Drill	dis 20
Morse "	dis 15
Skinner's Comination Lathe	dis 40&10
" Independent Lathe	dis 40&10
" Universal Lathe	dis 40&10
" Drill	dis 20

Cutters and Reamers.

Cleveland	dis 10@15
Pratt & Whitney	dis 10@15
Standard	dis 10@15
Morse	dis 15
Brown & Sharpe, Milling Cutters	dis 15
" " Gear Cutters	dis 15

Crowbars.

Cast Steel	℔ 3½
Iron, steel points	℔ 1b 3

Drill and Drill Sockets.

Twist Drills	dis 50&10
Morse Taper and Straight Shank to 1¼"	dis 50&10
Morse Taper and Straight Shank Larger than 1¼"	dis 25
Drill Sockets	dis 25
Standard Twist Drills	dis 55@55&5
Cleveland " "	dis 55@55&5

Emery.

	No. 4 to No. 46 gr.	No. 54 to 150 gr.	Flour, C. F F. FF.
Kegs, ℔	4¼c	5 c	2¼c
½ kegs ℔	4¾c	5¼c	2¾c
¼ kegs ℔	5 c	5½c	3 c
10 ℔ cans, 10 in case	6 c	6½c	5 c
10 ℔ cans less than 10	10 c	10 c	7½c

Emery Cloth and Paper.

Barder, Adamson & Co.	dis 50@50&5
H. H. Barton	dis 50@50&5

Emery Wheels.

Detroit	dis 60@70
Norton's	dis 60@70
Grant	dis 60@70
Sterling	dis 60@70
Celluloid	dis 10&33⅓
Northampton	dis 55
Crystal	dis 65@70
Vitrified	dis 60@70
Vulcanite	dis 60&10
Hamden	dis 60&10@70
Cyclone	dis 60@60&10

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* Daily. † Daily, except Sunday.

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Pittsburgh and Bellaire	† 7:00 am	†12:10 pm
Salem and Pittsburg	* 8:00 am	* 8:30 pm
Pittsburgh, Bellaire and East	†12:45 pm	† 6:25 pm
Philadelphia and New York	* 1:40 pm	*11:25 am
Baltimore and Washington	* 1:40 pm	*11:25 am
Alliance and Pittsburgh	* 1:40 pm	*11:25 am
Ravenna and Alliance	† 3:25 pm	† 9:50 am
Hudson and Ravenna	* 5:00 pm	* 8:25 am
Philadelphia and New York	*11:10 pm	* 5:25 am
Baltimore and Washington	*11:10 pm	* 5:25 am
Alliance and Pittsburgh	*11:10 pm	* 5:25 am

Mt. Vernon and Pan-Handle Route

FROM CLEVELAND TO	LEAVE	ARRIVE
Xenia and Cincinnati	* 8:40 am	* 5:15 pm
Akron and Columbus	* 8:40 am	*5:15 pm
Akron, Columbus & Zanesville	†12:45 pm	†12:10 pm
Akron and Orrville	† 3:25 pm	† 9.50 am
Columbus and Cincinnati	* 8:00 pm	* 6:55 am

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	Arrive.	Depart.
Valley Jctn. & Way Stations	*6:30 P M	*7:10 A M
Akron, Canton & Valley	*10:10 A M	*3:15 P M
Akron, Canton & Chicago	*8:10 A M	*6:30 P M
Akron, Canton & Wooster, Defiance, Garrett, Marietta, Wheeling, Washington, D. C., and Baltimore	†2:55 P M	†11:00 A M

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Ar. Buffalo, 7:30 A.M. | Ar. Cleveland, 7:30 A.M.

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M. H. KILGALLEN, Gen'l Mgr. CHICAGO

Files.

Arcade	dis 60&10@60&10&10
Nicholson	dis 60&10@60&10&10
" X. F.	dis 25
Kearney & Foot	dis 60&10@60&10&10
Black Diamond	dis 60&10@60&10&10
McClellan	dis 60&10@60&10&10
Disston's	dis 65@70
Western	dis 70
Stub's	dis 25
Grobet's	dis 30
Reynolds Bros.' Hand Cut	dis 50
Industry File Works Hand Cut	dis 50

Hammers.

P. S. W	dis 40
Atha new list, Jan. 15, 1887	dis 50
Heavy hammers and sledges under 5 lbs	12c
" " " " over 5 lbs	10c

Jack Screws.

Illinois Bolt Co. list	dis 75

Nuts and Washers.

Size of bolt inches	¼	5-16	⅜	½	⅝	¾	1
Square	8	7	5½	4¼	4	3¾	3½
Hexagon	15½	11½	8½	6	5¾	5¾	
Washers	9	8	7	5	4½	4½	4½

In lots less than 100 lbs, ₱ lb add ½c., 1 lb boxes add 1c to list.

Nails (wire).

List July 14, 1887	dis 85
Standard Penny Nails, ₱ keg card rate	
Car lots	$2.30
Less than car lots	$2.50

Oilers.

Zinc and Tin	dis 60
Brass and Copper	dis 50
Malleable (Hammer's), No. 1, $3.60; No. 2, $4.00; No. 3, $4.40 ₱ doz	dis 10@10&10

Picks.

Railroads, 5 to 6 lbs	$12 dis 60
" 6 to 7 lbs	$13 dis 60

Pulleys.

Iron Pulleys, Walker List	dis 50
Medart Pulleys	dis 50
Split Wood Pulleys	dis 55@60

Pulley Blocks.

Moore's Anti-Friction Differential Chain Pulley Block	dis 20

Rivets.

Iron, Thousand, list November 1, 1894	dis 60@65
Iron, Ordinary, Cooper's Block and Carriage list November 1, 1894	dis 60@65
Copper	dis 50@50&10

Saws.

Disston's Circular	dis 40&20
" Band	dis 25
" Scroll	Net
Hack Saw Stubs	dis 20
" " Eureka	pis
" " Star	dis 20
Saw Swages Diston's	dis 30
Atkins' Circular Saws	dis 40 & 40
" Mill, Mulay and Drag Saws	dis 40&10
" Wood Saws	dis 40&10
" Silver Steel Diamond Cross-cut Saws	70c per ft
" Dexter Cross-cuts	50c "
" Diamond "	30c "
" Tuttle Tooth Cross-cuts	25c "
" One-man Cross-cuts	30c "
No. 1 Handles	23c per pair
No. 6 "	16c "
Excelsior Saw Tools	$6 per doz
Derfection "	$15 "
Petroit Saw Works, Circular	dis 50
" " " Band	dis 25
" " " Mulay	dis 45

Taps.

Cards, Hand and Nut to 2 in	1s 50
Carpenters' " " "	dis 50
Morse " " "	dis 50
Pratt & Whitney " " new list	dis 10
Machine Screw Taps	dis 55
Pipe Taps to 2½ in	dis 70
Stay Bolt Taps	dis 25
Stove Bolt Taps	dis 55
Pulley Taps	dis 40

Vises.

Solid Box	dis 60
Parker's	dis 20@25
Prentiss	dis 20
Stephen's	dis 25@30
Barrett's	dis 30
Miller's Falls	dis 40
Merrill's	dis 15@20
Howard	dis 35

Wire.

New List, Apr. 9, 1894

Brass	dis 4c
Copper	dis 4c
Bright and annealed, Nos. 0@18	dis 70&10@75
" " Nos. 19@26	dis 75@75& 5
" " Nos. 27@36	dis 75&10& 5
Coppered Nos. 0 to 18, market list	dis 70@70& 5
Galvanized Nos. 0 to 18 " "	dis65&
Tinned market Nos. 0 to 18	dis 67½
Cast steel	dis 50
Tinned Broom Wire	dis 70&5@70&10
Annealed Fence, Nos. 8 and 9	dis 75
Annealed Grape, Nos. 10 to 14	dis 75
Stub's Steel Wire regular	95c ₱ lb dis 3c

Wrenches.

Coe's genuine	dis 50
Girard Standard	dis 70&10
Agricultural	dis 75&10
Mechanic's	dis 55&10& 5
Bemis & Call's Combination	dis 35
Donohue's Engineers	dis 20&10
Lamson & Sessions Engineers	dis 60
Billings & Spencer's Drop Forged	dis 25
William's " "	dis 25
Alligator " "	dis 40

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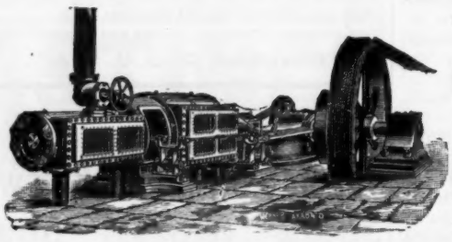

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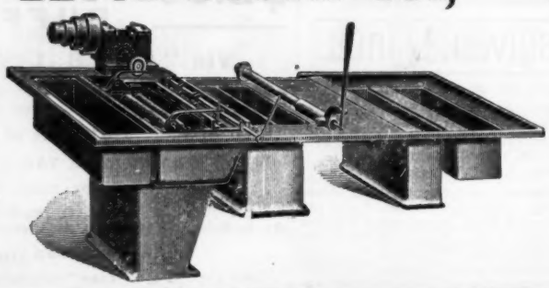

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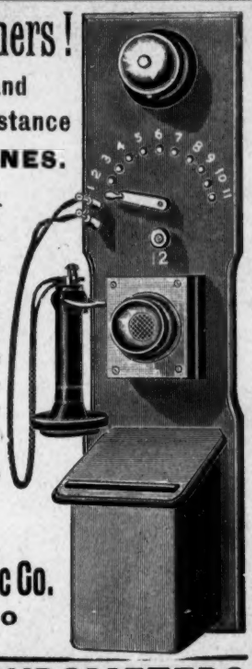

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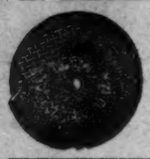

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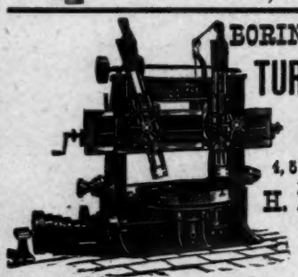

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